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THE MAGAZINE FOR APPLE II® ENTHUSIASTS

JUNE 1990  
VOL. 11 / NO. 6  
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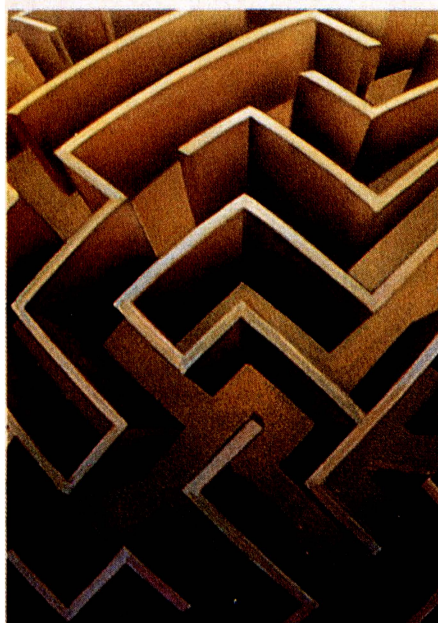
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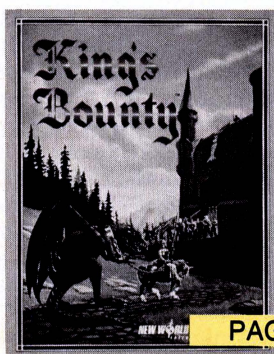
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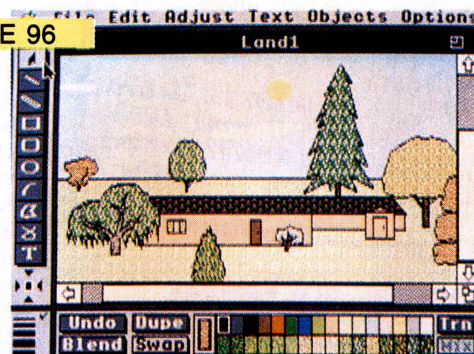
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## Dear Readers:

We'd like to hear from you! Whether you have questions you need answered or you'd just like to share your thoughts on articles and issues, drop us a line.

Send your letters to: **Letters, Nibble, 52 Domino Drive, Concord, MA 01742.** (Letters may be edited for length.)

## OLD DOS, OLD TRICKS?

► I just got a copy of the April 1990 *Nibble*, and felt compelled to write.

I have been an Apple II owner, user and enthusiast since 1982, and have owned and used II Plus, IIe, and IIGS systems both at home and at work. From the beginning, I, like many others, craved good information and publications, and *Nibble* was my overall favorite. Recently, however, there seems to be less and less relevant information in your magazine.

For example, in this issue, two of the feature articles (RAM Disk 3.3 and ProDOS Linker) relate all the way back to DOS 3.3. Please don't misunderstand — I am not condemning references to DOS 3.3 or the publication of articles relating to it. I am saying that this is certainly not anywhere near state-of-the-art, nor are the other articles in this issue.

For the past few years, there have been numerous "doom & gloom" stories circulating about the inevitable death of the Apple II line. I, for one, still believe the machine has a lot to offer. If, however, the publishers of magazines such as yours cannot promote its current (and future) capabilities, its death will most certainly be inevitable. A II Plus running DOS 3.3 simply cannot stand up to the newer

MS-DOS and Macintosh systems with megabytes of memory, windowed environments, faster processors, and so on.

The IIGS has incredible possibilities. With the addition of memory and accelerators, these grow further. There are currently rumors of a 20MHz 65816 CPU being considered. These are the hopes of all real II users. Applied Engineering's PC Transporter allows running MS-DOS on an Apple: this should not be considered as taking a step away from the II, but rather recognition of the fact that the world is demanding more ability to exchange information with other systems, and have more compatibility with them. My dream machine would be an enhanced IIGS running at 20 MHz, with lots of memory and a 386-based Transporter. I'd love to see Unix or some other multiprocessing operating system running on the 65816. Without the dreams to spark interest and development such a machine will never exist. In the old days, Apple II users felt nothing was impossible.

I feel it is the responsibility of publications such as yours to seek out and promote such ideas, spark new interests, and encourage development. Face it, DOS 3.3, like the 128K Macintosh, floppy-based MS-DOS, and radios using vacuum tubes, is history. If the Apple II does survive, it will be through growth — not by clinging to past memories, no matter how fond of them we may be.

James A. Westlake  
San Jose, CA

*DOS 3.3 may be "history" in some books, but it is still a simple, reliable operating system. As you may know from reading past Viewpoint columns, the entire Nibble accounting and order entry system runs under DOS 3.3 on a Corvus hard disk network.*

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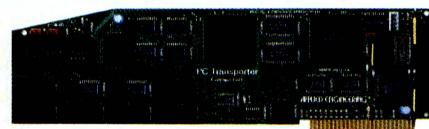
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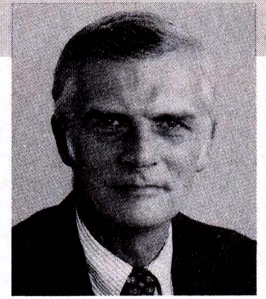
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MGAD



# The Apple II: Stay Tuned . . .

**A**fter more than two years of virtual invisibility, the Apple II is coming into sharper focus. This has been stimulated by:

- Wall Street, which hammered Apple Computer's stock earlier in the year for the company's neglect of the low-end personal computer market.
- Numerous letter-writing campaigns by you — concerned Apple II owners who have felt ignored, alienated, and orphaned.
- Sharply declining sales of the Apple II.

The convergence of these market forces set the stage for a series of open and candid communications between Apple Computer and the developer community. Late last year, I joined the board of the newly formed Apple II Developers Association to participate in those meetings with Apple. The other members of the ADA board are:

- Barney Stone, president of Stone Edge Software
- Roger Wagner, president of Roger Wagner Publishing
- Bob Hardman, vice-president of Applied Engineering
- Tom Weishaar, president of A2-Central
- Mark Simonsen, vice-president of Beagle Bros
- Paul Boule, publisher of *InCider*.

The members of the group have one important thing in common: We all make our living in the Apple II market. Over the months, a number of position papers, informal communications, and direct meetings with Apple have sharpened the issues and strategies that are important to the future of Apple Computer and the Apple II.

## SOME REALITIES

Apple Computer clearly understands that Apple II owners feel frustrated and neglected. Apple also understands that both developers and consumers have made a massive investment in software for the Apple II. And Apple realizes that it is simply not good business to develop a reputation for orphaning a major customer constituency.

At the same time, Apple has an obvious dilemma. The bulk of new software and applications are being developed for the Macintosh. Furthermore, *if* Apple can develop and introduce a low-cost color Macintosh on a timely schedule, there are undoubtedly large economies of scale in adapting the Macintosh *engine*

to serve the low-end market. In everything from production, to parts, to training, to promotion, a single engine is the conceptual ideal.

Unfortunately, we live in a less-than-ideal world.

IBM, Tandy, and the clone manufacturers are attacking Apple's traditional markets with a vengeance. IBM upped the ante in January with a stated intention of bundling the Trackstar 128e card with its PS/2 to provide Apple II compatibility in the education market.

## STRATEGIC DILEMMAS

The Apple II's performance has been steadily increasing, largely through the efforts of third-party developers. Applied Engineering's TransWarp III and Zip Technology's Zip Chip boost the Apple II processing performance up to eight times. Apple's most recent announcement is a high-speed SCSI card that improves disk access performance by up to 10 times. It comes with drivers for standard hard disks and Apple's CD-ROM drive; Apple is creating drivers for other SCSI devices, like scanners and tape drives.

Apple II performance improvements haven't been limited to hardware. Roger Wagner's HyperStudio has made significant inroads into the education market. More important, it has proved that hypermedia and the Macintosh user interface can be effectively implemented on an Apple IIGS. And if HyperCard for the Apple IIGS becomes a reality, it could spark a revitalized market interest in the IIGS.

A low-cost Mac faces the difficult challenge of providing a cost-effective alternative to *a system that already exists and gets the job done — the Apple II.*

## GETTING THE ACT TOGETHER

In late March, Michael Spindler, Apple's new president, acknowledged in his first major speech that "we have to really get our act together and figure out what we're going to do with the Apple II." Apple Computer is realistically keeping its options open while it tries to mend fences with its Apple II customer base. Here are some realities:

- Two champions of the Apple II have been named within Apple Computer: Jane Lee, Manager of Apple II Product Marketing, and Nancy Stark, Manager of Apple II and Peripheral Marketing.
- Apple *knows* that its reputation in the Apple II market has become tarnished and that Apple II

*continued on page 7*

# WELCOME TO NEW READERS

Welcome to *Nibble* magazine, one of the most interesting and useful publications available for Apple owners. *Nibble* publishes an outstanding collection of valuable Applesoft BASIC and other applications that you can type and run right from the magazine. And every application is supported with an article that shows you, step-by-step, how to put the project into your Apple II and how it works — even if you know nothing about programming!

If you're new to computing, however, you may find the world of programs a bit confusing at first. If this is the case, perhaps the best advice would be to spend some time with the manuals that came with your computer. Once you understand how to get Applesoft BASIC up and running, you'll be surprised at how easy it is to enter programs into your Apple. It's always a good idea to start small, with a short BASIC program. Don't forget to review the Typing Tips in this issue as well.

## THE BASICS...

Applesoft BASIC is built right into your Apple II. You can type in and run BASIC programs without using your disk drives at all, but if you want to save your programs for later use, you'll need to follow the instructions in your owner's manuals to get BASIC and the disk operating system up and running.

Once you do, you will most likely see a "J" character, called a *prompt*. When you see the prompt, your computer is waiting for you to tell it what to do next. You can:

- Type commands from the disk operating system (e.g., CATALOG)
- Type commands in BASIC (e.g., PRINT 36\*42)
- Type in a BASIC program line (e.g., 10 INPUT NAME\$,ADRS\$)

All BASIC programs consist of a sequence of numbered program lines. The program lines consist of a line number followed by one or more BASIC statements separated by colons. For example,

```
20 FOR I = 1 TO 5: PRINT CHR$(7):  
NEXT I
```

To enter a program, start with the first numbered program line and type it in — including the line number itself — exactly as it appears in the listing. Though a program line may span several printed lines in the listing, do not press Return (the Return key) until you have typed the entire program line. Repeat the process with the next program line, and continue until you have entered them all.

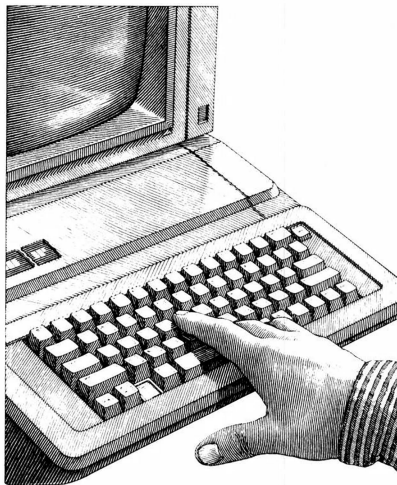
To enter the program in Listing 1, follow this sequence:

1. Make sure the Caps Lock key is down.
2. Type NEW and press Return to erase any program lines that may already be in memory.

3. Type line 10 exactly as it appears, pressing Return after typing the last word in the line ("BELL").
4. Repeat this process for lines 20-30
5. Type SAVE RINGER and press Return to save the program on disk under the name RINGER.
6. Type RUN and press Return to start the program. If you entered each line correctly, you should hear a bell ring five times.

### LISTING 1

```
10 REM RING THE BELL  
20 FOR I = 1 TO 5: PRINT  
CHR$(7): NEXT I  
30 END
```



## ...AND BEYOND

In addition to BASIC, *Nibble* also publishes programs written in *machine language*, the Apple's own internal language. Machine language may at first be intimidating, but you do not need to know all about it in order to use it and harness its power and lightning-quick speed. *Nibble* articles have special instructions for entering and saving machine language programs.

Often, programmers use what is called an *assembler* to translate *assembly language* into machine language. Assembly language is slightly more English-like and readable than machine language, which appears to be nothing more than *hexadecimal* numbers, or *hex codes*. Hex codes are usually two-digit numbers, with the letters A through F included as digits (e.g., 01, 23, 5F, and EE are all valid hexadecimal numbers).

If you have an assembler, you can type in the assembly language (or *source code*) listings in an article. If you don't have an assembler, you can enter the machine code directly into your computer. Machine language listings have lines that consist of a three- or four-digit hex number followed by a colon and several two-digit hex codes separated by spaces. For example,

```
300:A2 05 20 DD FB CA F0 03
```

Listing 2 is a short example of a machine language program in a format that we publish in *Nibble*. The following step-by-step instructions show you how to load it into your Apple and run it.

1. From the "J" screen prompt, type CALL -151 and press Return to switch into the System Monitor. You should now see a screen prompt, "\*" (followed by the blinking cursor).
2. At the cursor, type

```
300:A2 05 20 DD FB CA F0 03
```

and press Return. Be sure to include the spaces between the pairs of hex characters. You have just entered the first line of the machine language program.

3. At the prompt, type the next line,  
308:4C 02 03 60

and press Return. This is the second and last line of the machine language program.

4. Now press the Control and C keys together, followed by Return to go back to the familiar "J" prompt.
5. To save the machine language program as a *binary* disk file, type

```
BSAVE RINGER.BIN,A$300,L$C
```

The A\$300 is the hexadecimal address in memory where the program resides. It corresponds to the 300 that you used in the first line of the program. The L\$C specifies the length of the program, which contains 12 pairs of hexadecimal characters (\$C is the hexadecimal equivalent of 12).

### LISTING 2

```
300:A2 05 20 DD FB CA F0 03  
308:4C 02 03 60
```

To run the program, type CALL 768 and press Return. This causes your Apple to begin running the machine language program at memory location 768 (which is the decimal equivalent of \$300 hexadecimal). You should hear the bell ring five times each time you type CALL 768.

In this column, we have instructed you to press Return after typing a statement or a command. With the programs in the magazine, however, we do not include the Return instruction. Assume that you need to press Return at the end of each program line.

## FIRST AID

To help you avoid typing mistakes, *Nibble* has developed the Checkit system, which alerts you of any typing mistakes you might make. The Typing Tips section explains Checkit and also has information about our Technical Support Department, which is devoted to helping you get your *Nibble* programs up and running.

## VIEWPOINT continued from page 5

owners are a concerned and articulate group. The company intends to continue selling, supporting, and servicing the Apple II for the foreseeable future. It acknowledges the strategic importance of the Apple II in key markets like education.

- Apple is supporting Apple II sessions at the Worldwide Developer's Conference in May and the A2-Central Developer's Conference in July.
- Apple will become more diligent in including references to the Apple II in its press releases.
- User groups will become an increasingly important part of future Apple II promotional events. Apple-fest-type conferences will be smaller, but will probably appear with more frequency in different regions of the country under user-group sponsorship. Notable examples are the National Apple User Group Conference recently held in Chicago, and the AZApple Fiesta to be held in Arizona.

### STAY TUNED...

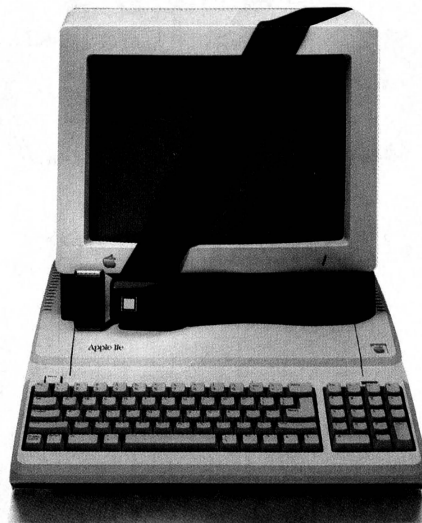
It's pretty clear that Apple is going to try like crazy to develop a low-cost color Macintosh (LCM). But it's also apparent that an LCM has a tough hill to climb, and it's unlikely to come soon. An LCM will have one additional challenge. *Apple II software compatibility*. No one will confirm any development effort in this area, but software compatibility is an obvious necessity to make a low-cost Macintosh an effective competitor in the low-end market — particularly in education. If nothing else forces Apple II compatibility, the requirement for meeting technical bid specifications in education proposals will be the stimulus. And this is a requirement that IBM and Tandy can now meet.

It's really a shame that Apple Computer still underestimates the Apple II as a competitive system for a broad spectrum of applications. But there are encouraging signs. The Apple II does have its champions. The issues are no longer being ignored. Apple Computer is showing for the Apple II user community. Future decisions will be conscious, considered decisions influenced by financial and market realities.

The bottom line is that there won't be any cataclysmic changes in the short term. Apple still has to define an effective strategy and product line for the low-end market. And the Apple II is still alive and kicking. Stay tuned...

*Mike Harvey*

**Mike Harvey**  
Publisher/Editor



## Seatbelts Suggested

Buckle your seatbelts for TransWarp III. More than eight times as fast as the IIe's native speed, with upgradeability to more than twelve times as fast! Frankly, we're obsessed with keeping your Apple II going at maximum speed and TransWarp III for the Apple IIe, II+ and II is the latest result.

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Hi-Res screen. Think it's easy to win at first? This is a smart program — the more you play, the better the Apple gets!

■ **Pyramid** presents a challenging solitaire card game on the Hi-Res screen. Can you disassemble the pyramid and win? Use the card-drawing routines in your own programs.

■ **Fiver Dicer** is a Yahtzee-like dice game that requires a combination of luck and skill. You can play it with a friend or you can compete against your computer.

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■ **The Exterminators** will pursue you until they liquidate you, unless you get to them first. You can trick them into destroying each other, or use your Sonic Screwdriver to destroy nearby Exterminators.

■ **Bridges** is a game of clever strategy, with a golden cup as a prize. If you're careful, you can avoid outwitting yourself.

■ **Noggin** will boggle your brain and expand your vocabulary. This game challenges you to make words from the letters it shows on the screen.

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**NEW!**

## IIGS POWER ACCESSORIES

■ **Nibble Launcher**, a powerful Apple IIGS control center, lets you launch programs easily, without opening numerous windows.

■ **Speed Set GS** quickly and easily changes the speed of your Apple IIGS. Put away the Control Panel because this common activity can now be done under control of your own software.

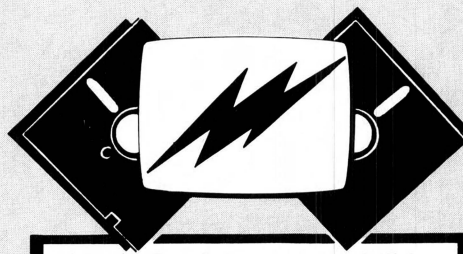
■ **Classic Desk Accessories** explores the structure and operation of these utilities. Sandy Mossberg also provides GSInfo, a CDA that keeps you posted on your system's inner workings.

■ **File Taper** is a Classic Desk Accessory that will display or print any type of file. Because it's a desk accessory, it's always available when you need it.

■ **Memory Peeker Desk Accessory** shows you what's going on inside your Apple IIGS, but you need a way to install it. Sandy Mossberg's utility is the perfect solution.

Note: 3.5-inch disk only.

Order No. **U08** IIGS Power Accessories **\$29.95**



## High Performance Utilities

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picture files of up to 38 mini-images, and use them in your own programs with ease.

■ **ImageWriter Color Control** is an AppleWorks preboot program that lets you select one of seven different ImageWriter II colors for printing your files or spreadsheets. Requires IIc, IIGS or 80-column IIe.

■ **Print Shop Label Maker** produces unique and personalized address labels with Print Shop and Beagle Bros Minipix graphic images. You pick where to print the graphics, and you can print up to three labels on each line. Does not support the IIGS printer port.

■ **Write Correspondence** is a collection of AppleWriter WPL programs that turns AppleWriter into an automated address filer and letter writer. Just select the address and it is automatically inserted into your letter and saved for printing the envelope. Throw out the Rolodex!

Order No. **U07** Clip Art & Friends . . . **\$22.95**



## Operating Systems

### PRODOS LIBRARY 2

Get a grip on your ProDOS files!

■ **ProDOS TYPE Command** gives you a quick, simple command for printer or displaying the ASCII version of any file. Simply enter TYPE: filename in immediate or deferred mode. To interrupt the output, you just press the Escape key.

■ **ProDOS-DOS 3.3 Doubleboot** lets you boot ProDOS or DOS 3.3 from a single disk. You can choose the system each time you boot up, or have Doubleboot automatically load one system by default. You must own both DOS 3.3 and ProDOS in order to create the Double-boot system.

■ **Recovering Deleted ProDOS Files** undoes accidental deletes. If you accidentally delete your file, this program will instantly recover it under ProDOS.

■ **ProDOS COPY Command** adds a COPY command to ProDOS for efficient file manipulation. Now you can conveniently copy files while you have a BASIC program in memory, and without resorting to the awkward FILER program. Use it to transfer files from within a BASIC program or an EXECable text file.

■ **ProDOS Directory List** lists every file in all the subdirectories on your ProDOS disks. No more searching through subdirectories for the file you want! Includes print options to the 40- or 80-column screen or printer.

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**NEW!**

### PRODOS ASSISTANT

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■ **File Revival** is Sandy Mossberg's full-featured utility to recover files you've accidentally deleted. ProDOS 8 versions 1.3 and later preserve the directory information this powerful program need

to reincarnate files inadvertently wiped off your disk, even if they were buried in a subdirectory.

■ **OmniType** is a new ProDOS command that quickly shows you the contents of BASIC programs, as well as text, AppleWorks, and other files.

■ **ProDOS Repro Command** is a powerful addition to ProDOS that copies entire directories with a single command. Move a directory of files from one volume to another quickly and easily, or load or clear your RAM disk by issuing a single command. You can speed up file transfer and hard disk backup, easily change the directory of your RAM disk, and selectively transfer only the latest version of your files.

■ **Startup Name Changer** allows you to run any program from any directory when you boot up. Just make sure your program's name conforms to standard ProDOS rules and the pathname is 64 characters or less, and you will never again have to memorize what each startup program does or keep them in the top level of the directory.

■ **Screen Print Command** installs directly into ProDOS, giving you a handy way to print the contents of your text screen.

Order No. **Q07** ProDOS Assistant . . . **\$26.95**

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Dr., Concord, MA 01742.

**Q** My Apple IIc utilities have something called a PIN number that is used to set the serial port. What is this, and how do I set it in my own programs?

**A** PIN stands for "Peripheral Identification Number," which is a system devised by Apple for condensing the various peripheral port settings into one phrase, so to speak. The numbers in the PIN value represent an entire combination of individual settings. For example, you may have seen communications programs that tell you that the parity setting is "8N1." This translates to "8 data bits, no parity, 1 stop bit." Without digressing to what this specifically means, suffice it to say that 8N1 is just a condensed abbreviation for the combined settings. The PIN value works the same way. There is not a hardware register in the IIc that this value is POKEd into. Rather, it is just a quick way of entering a group of values into a specific utility program that in turn sets the various parameters in the serial port. So, what does the abbreviation mean? The PIN value is a 7-digit code, where each position has the meaning shown in Table 1.

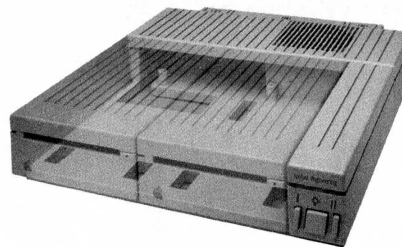
For a printer at 9600 baud, for example, the likely PIN number is 1561111. This tells the serial interface in the computer to be in the printer mode at 9600 baud, with a data protocol of 8N1 (8 data bits, no parity, 1 stop bit), and no echo of printed characters to the screen. The serial card will not add a line feed to each carriage return (the printer is probably set to do this automatically), and the serial port will not truncate lines at 80 characters (or any other value).

Note that this system is not specific to any particular computer, not even the Apple. Anybody that wanted to use this code could accept these definitions for the PIN value. In practice, the PIN seems to be used only by the Apple IIc, and requires a utility on the System Utility disk to take the PIN number and actually send the correct commands to the serial port to make good the desired settings.

If you want to use a PIN value in your own programs, you have to write a routine to take each character of the PIN string and send a specific command to the serial port.

*continued on page 90*

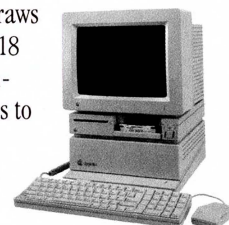
*Roger Wagner is the president of Roger Wagner Publishing Inc., the publisher of MouseWrite and the Merlin Assembler, and the author of Assembly Lines: The Book and Apple IIGS: Assembly Language for Beginners.*



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# IT'S BETTER TO FEEL GOOD!

**A** lot of important ingredients go into the recipe of a great game. You can simmer it with plots and puzzles, baste it with action, and even present it complete with mouth-watering graphics. But unless you include the type of user-interface, the gamer's controls, that can be quickly learned and almost instinctively used then you have just designed a steak without any sizzle.

This month's three games all address the problem of how to make a game "feel" to the gamer in different, and rather unique, ways. All are successful to one degree or another and, even better, they all look as good as they feel. And even comedian Billy Crystal ("It's better to look good than to feel good!") couldn't find fault with that!

## A Bountiful Pleasure

**King's Bounty** from New World Computing is an adventure game that I found I just couldn't stop playing. Unlike so many complex adventure games on the market, here's one that doesn't require the same mental effort to play as to learn College Physics. But the game itself is as deep, as rich in detail, and as convoluted in plotted concepts as the best of its rivals. But in the manner of play, it towers over most of the field.

First, let's get the plot out of the way. In this game, you are a hero who must recover good King Maximus' Scepter. The Scepter was stolen by the dragon Arech, the demon King Urthrax Killspite, and their assorted evil minions. With the Scepter out of his hands, King Maximus is sick, dying. And the land too is dying as more evil creatures begin to appear.

It's the kind of plot that could seem either really laughable or really interesting depending on the rulebook and scenario. This particular rulebook is written in a very nice prose style. Even better, it has been written by someone who knows mythology. The story has an intriguing depth. Readers

*Neil Shapiro is founder and Chief Sysop of CompuServe's MAUG. Write to him at MCU Inc., P.O. Box 520, Bethpage, NY 11714.*



who know of such things as Odin's Staff, The Wounded King, The Wasteland, and other myths will nod their heads as they read this latest rendition. Other readers will find themselves simply drawn in.

But the greatest story in the world would be nothing if the game could not be well played. In this case, a classic story and a perhaps soon-to-be classic game go hand-in-hand.

Controlled by keyboard, play is very simple. You move your party on an onscreen map of the world, continent by continent. Of course, your party is not the measly five or six adventurers of other games. In **King's Bounty**, entire armies accompany you.

The size of the armies depends on your leadership abilities; the better they are, the greater the size of the armies that will follow you. As you move about, you recruit archers and

pikemen, militia, peasants, and such things as ogres and dwarves, orcs and elves to join you in your quest.

Your quest takes you from castle to castle in an attempt to capture all of Arech's henchmen (henchthings?) and to find the Scepter. Each time you capture an evil one, you get another piece of a map to show you where the Scepter is. You have, depending on game difficulty, a certain number of game days to find the Scepter.

Magic spells can be used (some character classes are better than others) while both adventuring and in combat.

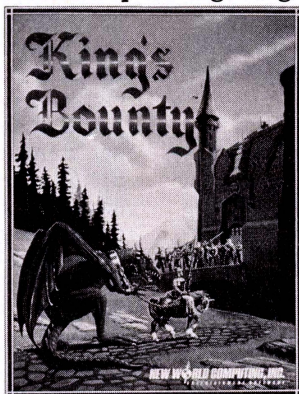
The evil ones hang out in various castles; you will want to "lay siege" to these castles to capture them. Thus, combat can happen in the open or in a castle. But, either way, it is done by tactically moving icons that represent your armies onscreen. Each icon is a

little, animated representation of the type of being depicted — from scaly orcs with huge bows to fairytale-like sprites. The manual carries long and very detailed tables that allow you to plan your battles as to which type of army is better than another, what results to expect, and the like. There's no reason to have to start this game fifty times before knowing what you are doing.

And, hurray for automapping! As you move, the game keeps track of all the terrain, castles, towns, and recruiting spots that you have discovered. Of course, those who enjoy graph paper need not ever access the function but, for people like me, it's a welcome addition.

The only thing I found in the game that I considered a design flaw is that it's a bit too easy to go after the bad-dies. When you go into a town you get a "contract" on which bad 'un to go after. For example, my first contract was on Hack The Rogue. So, I went

from castle to castle looking for him. I stumbled on some of his friends, but my contract was for Hack. But, later, I discovered a quirk of getting a con-



tract. It turns out that if you simply go to a town and keep asking you can sequentially cycle through different contracts. So, if you stumble onto Caneghor The Mystic while looking for Hack The Rogue, just go into any nearby town and change contracts!

Also, as mentioned, much of the game's basic appeal lies in the seriousness with which famous myths are treated and have been incorporated into play. So, I wish the programmer had not given in to humor in the naming of a few places such as Castle Kookamunga. I don't like when a game expects you to believe in it, and yet laughs at itself unexpectedly.

Still, how high would I rate King's Bounty? About as high as the tip of a double-handed broadsword brandished aloft by a tall giant! The game is a wonderful introduction to role-playing and is also deep enough to satisfy the most advanced dungeoneer. I give it my highest recommendation.

*King's Bounty is available for the Apple IIe w/128K RAM from New World Computing, Inc., 2031 Ventura Blvd., Suite 200, Woodland Hills, CA 91364; (818) 999-0606. Includes disk, manual. Color monitor recommended. Please circle 120 on Reader Service Card*

## Is It? It Ys!

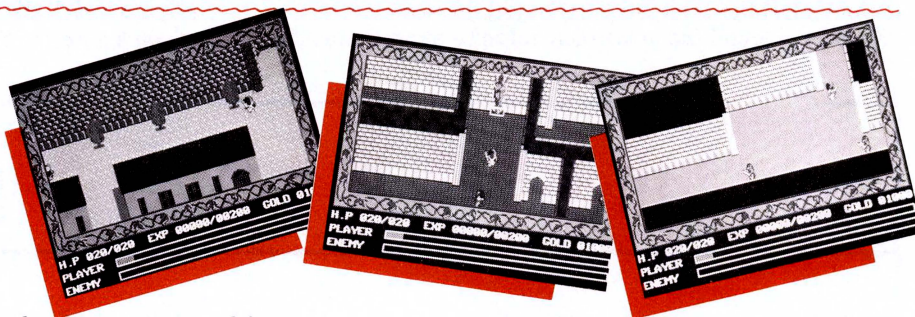
The Ancient Land of Ys from Kyodai blends the idea of a role-playing game with the action and reflex excitement of arcade-style gaming. It's a new "feel" to adventuring that, I think, will find many enthusiasts.

It starts off in a town, as do many adventure games. There you use your joystick or keyboard to move about, talking to people and buying various supplies before setting out on your quest.

Your quest in this game is to recover the Six Books of Ys hidden by the evil wizard, Malificus. The books hold a secret, that secret being the magic metal Kureria. Find the books, and obtain the secret.

Of course, there are a lot of creatures out to stop you! How many? Remember how scientist and TV personality Carl Sagan would soulfully recite the term "bill-yuns and bill-yuns of stars?" Well, there are "bill-yuns and bill-yuns" of battles awaiting you in this wonderfully deadly land of Ys!

You fight creatures basically by bumping into them. Run into them, pounce on them, meander into them — but don't run into them head-to-head. The first few hours I played this game, I was toast! But then I realized that coming up behind one of the creatures before butting into it, circling underneath, and generally being a sneaky ol' gameplayer was the best way to pro-



long my onscreen life.

And, it's good that the first creatures are as plentiful and as relatively easy as they are. After a while, once you get the hang of the game, you will begin to get cocky. You will feel like someone in size 10 boots stomping on ants at a picnic.

But the game's no picnic all the way through. The first time you enter a place like the Silver Mine, you'll be in for quite a shock. In fact, I'm not sure I want to ruin the surprise here. So, skip the next paragraph if you don't want a hint of sorts.

Occasionally, you are going to find what are called in the arcades "boss" creatures. These are very large opponents as compared to the run-of-the-mill smaller, knock-into-'em-whocares? variety. If you just bump your way into a Boss creature, good night Nurse! When you come up against a Boss, be sure that you save your game first. You will almost definitely be killed in the majority of battles that

you fight against such creatures. Luckily, the save game feature works here. The key in such a fight is a two-pronged tactic of evade and attack. Most of your time will be spent in evasion. If a Boss touches you, it's like a flame touching a moth. But if you can continue to evade, there will be times when you can quickly dart in and leap up from below the creature. Remember, it seems that only shots from below have much effect on the creature's health. So, completely forget any sort of frontal assault here!

Besides the arcade feel, there are also a lot of adventure-type puzzles to think over. For example, you will find chests that you will not be able to get to until you put two and two together and figure out what an item of equipment is for. And, you will have to visit various places before other places in order to obtain keys and the like.

All in all, the Ancient Land Of Ys is a most interesting addition to the genre of role-playing. It shows that

you really can successfully combine arcade play with adventuring. Of course, like any arcade game, you may find it more frustrating to the beginner than the usual adventure. But, persevere and develop your skills. The payoff is an enjoyable game with its own unique and outstanding feel!

*The Ancient Land Of Ys is available for the Apple IIGS from Kyodai, 58 Mitchell Blvd., San Rafael, CA 94903; (800) 521-6263. Includes two disks, manual.*

*Please circle 121 on Reader Service Card*

### A Fiery Finish

Firepower from Microillusions is an arcade tank battle with a few differences. For one thing it can be played player against player as well as one-player against the computer. In fact, in two-player mode, both players do not have to be in the same room, or even the same country. Play can be over the phone lines using any Hayes-compatible 1200- or 2400-baud modem.

In dual-player mode, the screen is divided into two windows. If it is player against player, each person sees his or her tank and radar display. If you are playing against an opponent via modem, one half of the screen is your playing area and the other half contains a window with a very simple terminal (telecommunications) program.

When you play against the computer, the screen is a little odd-appearing in that only one-half of the screen is utilized. The other half is simply black. Frankly, I would much rather have seen the one-player mode expanded graphically to take full advantage of the screen size and the optional, two-player modes settling for the windowed modes.

Control of the tank is by keyboard, joystick, or mouse. However, I found the mouse control to be almost unusable.

I simply could not get the tank to respond very well at all to mouse input. But with the joystick or keyboard, the game is fast and playable.

Essentially, the idea is to avoid the enemy tanks and helicopters and to shoot them before they shoot you. Also, many of your soldiers are kept captive in buildings. Shoot the buildings and they run out to your tank; you must give them a ride back to the first-aid station.

Unfortunately, the little soldiers are just brown dots. I can't understand this as, in just a 48K machine, Broderbund in their classic game of Choplifter made quite personable little animated figures to rescue in much the same type of scenario.

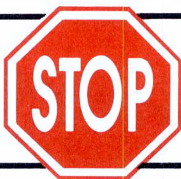
Another drawback is there is no manual included! The instructions are just on disk and cannot be printed out. So, as you cannot refer to them during gameplay, it may call for some extra pregame readings onscreen.

But, even with the above problems, I found Firepower to be a very interesting and easy to play and "get into" game. It's one of the best ways around to take your IIGS "to the arcade."

*Firepower for the IIGS (768K) is available from Microillusions, P.O. Box 3475, Granada Hills, CA 91394; (818) 360-3715. Includes disk but no manual (see above). Supports joystick, mouse, or keyboard and will utilize a modem for off-site play.*

*Please circle 122 on Reader Service Card*

**SPECIAL NOTE:** In a previous column, I reviewed Qix for the Apple IIe from Taito. I mentioned that the display made play a bit difficult as it was hard to distinguish some of the enemies (the "sparks"). Well, the new IIGS version is super! If you have a IIGS and have been waiting for Qix — go for it!



## the PAIN of typing Apple programs!

**T**yping perfect, error-free Applesoft programs from magazines and books is a pain. And machine language programs are even worse! With Applesoft, if you make an error you have to retype the whole program line. With machine language, you may have to go back and retype the WHOLE PROGRAM.

AccuType uses word processing techniques to make program typing much faster and easier... for both kinds of programs.

- If you make a slip and leave out some program characters, AccuType lets you go back and INSERT them, without having to retype anything else.
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- You can even search out a character or word every place it appears, automatically. It's great for finding important program variables and routines.
- And... if you're typing Nibble program listings, you get INSTANT error alerts with precision check codes for each Applesoft program line or each 8 bytes of machine language code.

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Remember, AccuType works with both Applesoft BASIC and machine language programs. Here's what AccuType users say:

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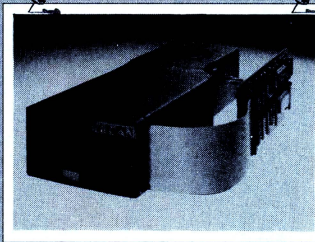
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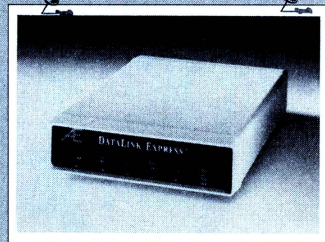
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■ Publish It! version 3 offers a host of new features, including: color printing capability, faster keyboard response time, improved graphics importing, increased PostScript support, AppleWorks 3.0 compatibility, Super Hi-Res image importing capability, PrintShop IIGS and Newsroom Graphics compatibility, and Cut, Copy, and Paste Groups. Upgrades to the new version will be available to all registered users for \$30. Otherwise, Publish It! 3 costs \$129.95. Timeworks, 444 Lake Cook Road, Deerfield, IL 60015; (708) 948-7626.

CIRCLE NUMBER 150

## THE KEYS TO HAPPINESS

■ The OmniMac Ultra offers you a PC-style keyboard for the Apple IIGS. Among its many features are dual sets of function keys — 12 function keys on the left side and 12 across the top. The keyboard also has F13 print screen, F14 scroll lock, and F15 pause keys. The cursor-control keypad has arrow keys laid out in a comfortable diamond pattern instead of the commonly found “inverted T” shape. When a key is pressed, there is an audible click and a slight resistance, and then it springs back up when released. Yet another feature included is Caps Lock, Num Lock, and Scroll Lock LED indicators located above the numeric keypad. The OmniMac Ultra costs \$159. Northgate Computer Systems, P.O. Box 4100, Plymouth, MN 55441; (800) 548-1993.

CIRCLE NUMBER 151



## SPEEDY SCSI

■ Move information up to 10 times faster between Apple IIs and microprocessor. The peripheral devices such as hard disks and CD-ROM drives. The new Apple II High-Speed SCSI Card provides the rate of 1MB per second, fastest data throughput available for the Apple IIe and Apple IIGS at no extra cost. The most noticeable improvement in speed is manifested in updated SCSI manager and very large files; the larger the file, the greater the speed improvement. The speed improvement is mainly due to a new feature called direct memory access (DMA) data transfer. Data is transferred directly between the computer's memory and the SCSI peripheral, with minimal interaction

CIRCLE NUMBER 152

## NETWORKS GO TO SCHOOL

■ To help educators understand the issues of computer networking, Scholastic Software has released a free 50-page Scholastic Guide to Educational Computer Networks. Scholastic has over 50 network software products that run on AppleTalk, Corvus/Apples, and other networks. Scholastic Inc., P.O. Box 7501, 2931 East McCarty St., Jefferson City, MO, 65101; (800) 541-5513; in MO, (800) 392-2179.

CIRCLE NUMBER 153



## POOLING RESOURCES

■ Watch tiny crab zoea getting caught in the stinging tentacles of the hydrozoan jellyfish. Marvel at hermit crabs trying out new shells in which to live. Spy on an octopus skulking for food and protecting itself with a jet of ink.

You don't have to travel to the North American sea coast. Just walk to your nearest Apple II, and **Exploring Tidepools**. Five fascinating activities are included in the program. Tidal Cycles helps students understand how tides are affected by the movement of the moon around the earth. East/West Tidepools allows students to compare and contrast West Coast tidepools with a typical New England tidepool. Students may also create their own tidepools within this activity. In Plankton Life Cycles, students gain greater knowledge of what happens to microscopic organisms brought in by the sea at the beginning of each tidal cycle. Who Eats Whom allows students to build food chains and webs of their own. And Reports/Graphs lets students generate both line and bar graphs using data gathered in other Exploring Tidepools activities.

Exploring Tidepools costs \$75 and runs on the entire Apple II family; it includes two disks, backups, and a Teacher's Guide. *Sunburst Communications, Inc., Pleasantville, NY 10570; (914) 769-5030.*

CIRCLE NUMBER 154

## MORE THAN AN ELEPHANT CAN REMEMBER

■ New from Chinook Technology is a user upgradeable 4-megabyte RAM card for the Apple IIGS and Apple IIe. It uses standard 1MB RAM chips and may be configured for 1, 2, or 4 megabytes of memory. The card is also DMA (Direct Memory Access) compatible, which means it will work with the new Apple II High-Speed SCSI Card. The RAM 400 costs \$159 configured with 1 MB, \$245 at 2MB, and \$417 at 4 MB. *Chinook Technology, 601 Main Street #635, Longmont, Colorado 80501; (303) 678-5544.*

CIRCLE NUMBER 155

## RAW DATA

### APPLE II SOFTWARE SALES SLIDING

■ Statistics released by the Software Publisher's Association confirm what you may have deduced from the shelves of your Apple dealer....Apple II software is not a hot selling category. Overall Apple II software sales declined 28.8 percent in 1989 compared to 1988. In the same period, Macintosh sales increased 22.3 percent, and MS-DOS software was up 16.2 percent, and Commodore sales dropped 37.5 percent.

Using data from 152 software publishers, SPA estimates \$42.4 million in Apple II software sales last year. MS-DOS sales were \$698.5 million, and Macintosh \$133.1 million.

Education software is the most lucrative category for Apple II publishers, grossing \$18.5 million last year. However, even this corner of the market lost out to MS-DOS sales of \$20.3 million. In comparison to the prior year, Apple II education sales were down 12.9 percent, with Mac education up 31 percent and MS-DOS up 9.8 percent.

In other categories of software reported for the Apple II, annual sales declines were as follows: desktop publishing, 68.4 percent; graphics, 55.3 percent; recreation, 48 percent; word processors, 34.2 percent; other productivity, 27.6 percent; and integrated packages, 6.1 percent.

The SPA announcement focused on the MS-DOS and Macintosh markets and concluded "North American software sales are clearly on an upward trend."

by Rich Williams

## SHARE YOUR DB

■ What can a developer do when he revises a good program to make it a great program? Release the older version as shareware, with hopes of enticing people to purchase the new version. That's what has happened with DB Master 5.0, now available for a shareware fee of \$45 with a full instruction manual. This program is not by any means wimpy. It allows up to 200 fields per record, up to 250 characters per field, and files up to 10 megabytes, running on a hard disk or

floppies. All sorting and searching functions are available, including a powerful report generator. Those who register as shareware users will receive a special offer for the relational DB Master Professional, which retails for \$295. DB Master 5 and Professional will run on an enhanced Apple IIe, IIc, IIc Plus, IIGS, or Laser 128. *Stone Edge Technologies, P.O. Box 3200, Maple Glen, PA 19002; (215) 641-1825.*

CIRCLE NUMBER 156

## A DISK WITH A VIEW

■ **Kid-Leidoscope**, a wide-ranging current events magazine on disk with accompanying four-page newspaper, is geared toward students in grades 3-8. Each issue will include a newspaper featuring articles of high interest to students of these grade levels. The first issue focuses on Wildlife, and introduces Kleid, the reporter. Kleid guides students through the issue exploring such topics as the rain forests, extinct animals, and the plight of the dol-

phins. Subsequent Kid-Leidoscope issues will cover Living in Space, Fitness, Money, and Dinosaurs. Through the end of the year, the first issue will cost only \$3 to cover shipping and handling. The cost per issue after that is \$19.95, which includes a double-sided disk and accompanying newspaper. A five-issue subscription costs \$79.95. *Methods and Solutions, Inc., 3130 North Dodge Blvd., Tucson, AZ 85716; (602) 322-6365.*

CIRCLE NUMBER 157

continued on page 90

# You'll Be Amazed At What

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Magazine

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**MINUTE**

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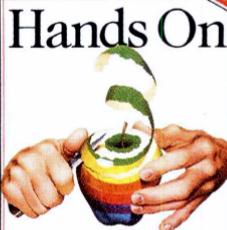
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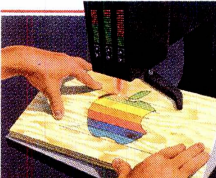
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# AppleSoft Power Tools



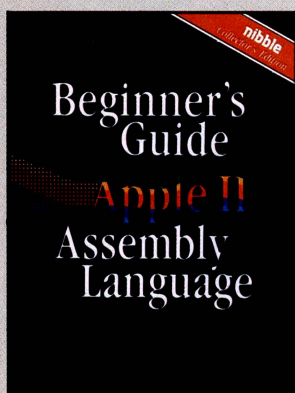
listings, or cross reference your variables and the lines in which they appear. Add sound effects, or your own graphics. Or goof-proof your subroutines. You get them all — ready to type and run.

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# You Can Do with your Apple

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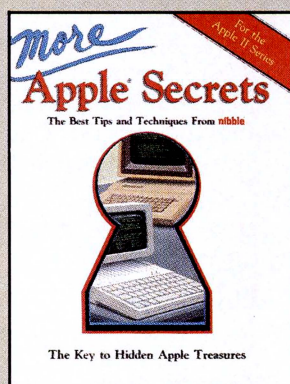
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# MEMORY MASTER

**M**emory Master is an extremely versatile memory editor. It displays a block of memory in both hexadecimal (hex) and ASCII and allows you to edit both directly. You can insert or delete bytes anywhere, and Memory Master either moves the affected memory above the point where bytes are inserted or deleted or "relocates" that part and adjusts addresses and branches accordingly throughout the entire program. It also provides a search facility to examine memory for a specified key, either a text string or a string of hex bytes. You can also move or relocate entire blocks of memory, or fill memory with a specified byte pattern. And you can look at disassembled code without leaving Memory Master. Memory Master runs under either DOS 3.3 or ProDOS without modification.

Why do you need Memory Master? There may be any number of reasons — here are just a few examples:

*J. Morris Prosser, 3157 Indian Village Rd., Pebble Beach, CA 93953. This program is compatible with DOS 3.3 and ProDOS.*



**Be the master of  
your Apple's  
memory**

1. You have several short programs, running at various addresses, that you want to combine. Use Memory Master to relocate the segments.
2. A program that you're writing keeps growing until it has reached an upper limit in memory. Use Memory Master to relocate it to a lower address.
3. You have several programs that run in the same space, and you would like to have them in memory at the same time. Use Memory Master to relocate one or more of them.
4. You have typed in a machine-language program from a magazine article, but you have left out a few bytes or typed one or more bytes twice. Use Memory Master to insert or delete them.
5. You want to move, relocate, or edit a portion of memory for any reason. Use Memory Master to do it.
6. You want to look for a particular string of bytes as either hex bytes or ASCII characters. Find it with Memory Master.
7. You want to view a section of code to look for embedded text. You can see the text clearly with Memory Master.
8. You want to enter a hex dump published in a magazine.

You can do some of these things with an assembler/editor, but that is sometimes less convenient than merely BRUNning Memory Master. And if you don't have source code, you have to go to the trouble of generating it before you can reassemble the code at a different location.

## USING THE PROGRAM

After BRUNning Memory Master, you enter ampersand (&) commands to use it. Acceptable forms of entry are "&\$XXXX" (where XXXX is a hex address), "&S" for the search function, and "&R" for the relocate/move function. Entering "&" alone or with any other characters following will result in an error message and a reminder of the acceptable forms. The search and relocate/move functions are available from the display mode as well as directly from Applesoft. To exit Memory Master, press Q.

You invoke Memory Master's different commands by entering various modes. The following section explains each mode.

### Cursor Mode

When you call Memory Master with a hex address, e.g., &\$8000, a 128-byte block of memory is displayed on the screen in both hex and ASCII, with the address entered in the top line and a cursor at the top left of the display. The bottom of the screen contains a legend showing the various commands available. The ASCII display has all characters shown in normal mode, except that control characters are replaced with periods. The hex cursor is an inverse ">" and the ASCII cursor is an inverse display of the character at the cursor position — in the case of lower-case characters, the character at the cursor will be shown in inverse uppercase.

You can move the cursor in a number of ways. The I, J, K, and M keys (and the Arrow keys) move the cursor up, left, right, and down respectively. When the cursor reaches the right end of the line, the next entry of K or the Right-Arrow key causes the cursor to move to the left end of the next line down. The reverse action results from left moves. Up or down moves beyond the top or bottom lines of the display result in scrolling down or up as appropriate. For larger jumps, F (for forward) moves the display to the next 128 bytes, and B (for back) moves the display to the previous 128 bytes.

### Hex Edit Mode

To get to the hex edit mode, enter H. A flashing cursor will appear and a new message will appear at the bottom of the screen. Entering hex digits now will replace the byte at the cursor position with the new entry, and the cursor will move to the right in position to edit the next byte. Entering any non-hex character will return to the cursor mode. This mode is particularly useful for entering code from a hex dump, since you can type in the bytes continuously, without entering spaces between bytes and without entering carriage returns. If you enter either of these, you will be returned to the cursor mode, since they are not hex characters.

### Text Editing Mode

To get to the text editing mode, enter T. A message asking whether the high bit should be set or clear will appear at the bottom of the screen. Enter either S or C and the message will change. The cursor will also change to flashing. Typing any character except control characters will now cause the ASCII code for that character to replace the previous contents of the byte at the cursor position.

```

MEMORY MASTER                                INS/DEL MODE:
(C) 1990 MINDCRAFT PUBL.                    UNSPECIFIED
-----
0800: >00 00 00 E8 0D DF 50 FF ...h. P
0808: 08 20 D7 10 20 76 12 2C . W. v. ,
0810: 83 C0 2C 83 C0 A9 10 85 .@. @) ..
0818: E1 A9 D1 85 E9 A2 03 A0 a)Q.i".
0820: 00 84 E8 84 E0 B1 E0 91 .h.010.
0828: E8 C8 D0 F9 E6 E9 E6 E1 hHPyfi fa
0830: CA D0 F2 2C 82 C0 60 BA JPr, @0:
0838: 86 E6 20 21 0B A2 40 A9 . f !."@)
0840: 0E 20 F5 11 20 0C FD 29 . u. .})
0848: DF A2 05 CA 30 F6 DD 60 _".J0v]0
0850: 08 D0 F8 20 ED FD A9 08 .Px m}).
0858: 48 BD 65 08 48 86 E7 60 H=e.H.g0
0860: D1 C5 C4 D3 C1 5E 69 7F QEDSAi
0868: A6 87 20 E7 0A A5 E4 85 &. g.%d.
0870: E0 A5 E5 85 E1 20 1B 0A 0%e.a ..
0878: 20 FD 0A 20 97 08 F0 EA }.. .pj
-----
CURSOR: I,J,K,M H)EX T)EXT R)ELOC
F)WD B)ACK S)RCH C)ONT L)IST Q)UIT
CTRL-I)NSERT CTRL-D)ELETE CTRL-R)ESET

```

Figure 1: Memory Master Menu

Entering a carriage return (or any control character) exits to the cursor mode.

### Relocate/Move Mode

To access the relocate/move function, enter R. You will be prompted to enter the starting and ending addresses of the block of memory to be relocated or moved and the starting address of the new location (destination).

*Relocation* means that all internal absolute address references (i.e. JMP, JSR, LDA, BIT, etc. referring to addresses within the block of memory to be relocated) will be changed to the corresponding addresses at the new location. In the case of a relocation, the start and end addresses entered should be those of the normal (run) location, even if it has been loaded at (or moved to) some other address. *Moving* a block of memory does just that — moves (copies) it from one location to another without changing it.

If you select relocation, you will be prompted for the present location of the block of memory. A default address will be shown (same as the start address), and if it is correct you can press Return to accept it. Otherwise, enter the starting location. At this point you will be asked whether all or part of the program is to be relocated (data, text, etc. should be moved, not relocated). If you want to relocate only parts of the program, you will be prompted to enter the start and end address of each segment. As you enter segment addresses, use addresses at the original location, whether or not it is the running location. This makes it easier to determine the segment's new start and end addresses.

When there are no more segments to be relocated, enter a carriage return alone. You will now be asked whether the block should be moved to the new location. You may want to have it remain where it is, perhaps to be saved back to disk, if the new location is otherwise occupied at the time. (If you have selected a move only, of course, the move will be executed immediately, with no further inputs.) Following the relocation or move, the display will return to the hex-ASCII dump in cursor mode, starting at the destination address (unless the block has not been moved, in which case the display will begin with the original address). Note that the relocation operation will take place at the address given for the present location, whether or not the block is moved.

## Insert Mode

To get to the insert mode, press Control-I. You will be asked for the end address of the program or data to be edited. The reason for this is that all bytes from the cursor address to the end address will be moved up one position in memory for each byte that is inserted, so the program needs to know the end address. You will then be asked whether to relocate or move the bytes above the cursor position. The meanings of relocate and move are the same as above, except that in the insert mode it is necessary to check and correct all internal branches as well as absolute address references. If you use the relocate mode, you will be asked for the start address of the program to be edited, so these references can be checked. You will notice also that the INS/DEL MODE indicator at the top right of the screen will change as appropriate.

---

*You can insert or delete  
bytes anywhere, and  
Memory Master will  
adjust the code  
automatically.*

---

Inserting bytes follows the same procedure as the hex edit mode, with any non-hex entry returning to the cursor mode. The contents of memory locations above the cursor position will be moved up as each byte is inserted, and addresses will be corrected, except that any addresses entered in the current insert operation will not be changed. The end address entered must be above the cursor position and the start address must be below the cursor position or they will not be accepted.

## Delete Mode

To enter the delete mode, press Control-D. If during the session you have already entered insert or delete mode and you have not moved the cursor outside the start and end addresses that you specified at that time, you will not be prompted for addresses. Regardless, the text at the bottom of the screen will change, telling you that pressing the Space bar deletes the byte at the cursor position, while pressing Return or another control character exits to the cursor mode. No other keys will be recognized. The contents of memory locations above the cursor position will be moved as bytes are deleted, but addresses will not be corrected until you exit delete mode. If the deletion extends to the end of the program, you will be returned to the cursor mode automatically when the end is reached. The last byte of the program cannot be deleted in this mode.

## Search Mode

To get to the search mode, enter S. The display will change and you will be prompted for a search key. This may be either an ASCII string or a string of hex bytes. ASCII strings will be converted to uppercase, and during the

search all bytes will be converted to uppercase normal for comparison. This means that any combination of upper-and lowercase, inverse, normal, or flashing can match the search key. If you want the search to be more specific, enter the hexadecimal equivalents as a hex search string.

Within the ASCII search key, you can use the asterisk (\*) as a wild card for any character but the first and last. Hex search keys should be entered by first typing a dollar sign (\$) and then hex bytes with a space between bytes, just as when entering bytes in the System Monitor. "AA" is a wild card for hex search keys.

If Memory Master finds the search key, the display will change to the cursor mode, with the matching string starting in the top row and the cursor positioned at the beginning of the string. To search for the next occurrence of the search key, enter C (for continue). When there are no more matching strings found, you will be so informed. You will also be informed if the search key is not found in memory within the specified search range. The start and end addresses for the search mode are not affected by the cursor position.

## Reset Mode

To get to the reset mode, enter Control-R. This will give you the opportunity to change the start address of the hex-ASCII display. Enter a carriage return alone if you don't want to change it. The reset mode also resets the INS/DEL MODE to "UNSPECIFIED" and clears the flags which indicate that the end address has been entered and the INS/DEL MODE selected. Note that when you enter R (for relocate/move) the INS/DEL MODE is reset to "UNSPECIFIED" just as with Control-R, but the start address of the screen display will depend on the addresses entered for the relocation or move. The reason for this is that some of the same pointers are used in the relocate/move process, the insert/delete modes, and the hex-ASCII display.

## List Mode

The list mode is entered by pressing L. In this mode, a disassembly list is displayed. The list is similar to the disassembly list available in the System Monitor, except that it shows only 16 lines, it can be single-stepped by pressing the Space bar, and it can be paused and restarted by pressing any key except Escape, which exits to the cursor mode. The start address of the hex-ASCII display is not changed. There is an additional command available when first entering the list mode. If the first byte occurs in the middle of an instruction, the disassembly will not be correct. Pressing the Left-arrow key backs up the start of the disassembly list one byte each time, but this occurs only before any other keys are pressed. After another key is pressed, the Left-arrow will start and stop the listing like any other key.

## Quit

For a clean exit from Memory Master, press Q while in the cursor mode. This will restore the normal reset vectors and the zero page locations used by Memory Master. This is the only way to exit without adverse effects on other programming.

## Notes

The memory range \$C000 to \$C0FF is not real memory, but is used for "soft switches" that control screen displays, peripherals, and so on. For this reason, addresses in this range should not be displayed or searched. Memory Master skips over this range of memory, going directly from

\$BFFF to \$C100 and vice versa. It does not check for moves to this range, so be careful not to move anything there.

If the address range you specify for a search includes the range \$400 to \$7FF, you may get one or more indications that the search key has been found, but the search key may not appear in the listing. This is because that is the text screen memory, and the text screen is changing as the memory dump is printed, so that what was found there by the search routine may not still be there when the listing is displayed. It is impossible to guarantee a completely accurate dump of this range of memory.

---

## *You can search for ASCII strings or hex bytes, and wild cards can be included.*

---

Once a search key has been entered, it remains in memory and will be shown as a default, so that entering a carriage return causes the same search key to be used. If you want to change the search key, just type it in. When the first character is typed, the line will be cleared and your input will be accepted. If there is no search key, one must be entered.

Initially, the range of memory to be searched is defined as \$0800 to \$BFFF, which will be shown as defaults. If you want to search through this range, press Return when prompted for start and end addresses. If the relocate/move function is used, these addresses will be changed, since the same pointers are also used for these functions. If you enter different values, they will be retained as the default addresses.

When using the insert or delete modes, you may be undecided as to whether to use relocate or move. If you are modifying a working program, you would normally use the relocate mode. Be careful to insert or delete complete instructions (including operands) during any single insert or delete operation. Otherwise the program may make incorrect changes during the relocation process.

If you have entered a program from a hex dump, as printed in a magazine for example, you will probably want to use the move mode for inserting bytes you have omitted or deleting bytes you have repeated. In this case, the addresses would be correct if all the bytes have been entered correctly. Be aware that if the program being edited contains text or other data, it may be changed in the relocation process. For such cases, it is a good idea to save the data segments separately, replace their memory locations with something that disassembles as a one-byte instruction (e.g., \$EA or \$00), then move the data back in after editing. You could leave the data in place while editing, then replace it later, but there is some danger that relocations following the end of the data portion will be done incorrectly.

Note that, in the insert and delete modes, you cannot enter an end address lower than the cursor position or a start address higher than the cursor position. There is no error message, but the bell will sound and the input will not be accepted. In addition, if the cursor is positioned out-

side the previously entered start and end addresses, new ones will be requested when the insert or delete mode is entered.

In the relocate/move function, the move portion is similar to that available in the Apple System Monitor, with one exception. The Monitor's move function cannot be used to move a block to a higher memory location if the two ranges overlap, because it moves bytes starting from the bottom, which would overwrite some of the bytes to be moved. This program does not have that limitation; it can move even a large block of memory up either many or a few bytes, since it checks the direction of the move, and if the move is up it moves bytes starting from the top. Because of the way the Monitor move function works, it can be used to fill a block with a particular repeated byte pattern. If you want to do this with the routines in Memory Master, enter "F" (for fill) instead of "R" or "M" when prompted.

Be very careful when using the relocate functions, either in the relocate/move mode or in the insert or delete modes, since the program can be severely damaged if the wrong addresses are entered or if the program contains text or data. It is always a good idea to have a backup copy before modifying a program.

When using any function other than the hex-ASCII display, it is possible to cancel the operation and return to the hex-ASCII display by pressing the Escape key whenever an input is expected. If you have started to enter a search key or an address and want to cancel it and start over, press Escape; the cursor will return to the beginning of the input line and the line will be cleared. Of course you can also back up with the Left-Arrow. If the cursor is at the beginning of the input line, or if only a single keypress is expected, pressing Escape will immediately return you to the hex-ASCII display. If you are in the relocate/move mode, pressing Escape before the relocation or move has been made will prevent the relocation or move. Of course, if you have already relocated segments of a program, the changes will not be reversed. In this case it is best to start over with an unmodified version of the program.

---

## *In any of the other modes, pressing Escape will return you to the cursor mode.*

---

Control-Reset always returns to the hex-ASCII display, but the start address of the display may be unpredictable, since the pointers for the start address of the display are also used in the relocate/move function.

One area that should not be edited is the zero page of memory. Many zero page locations are used by Memory Master and the Monitor, and some of those used by Applesoft are not reinitialized when returning to Applesoft. Use extreme caution if you change any of these locations.

If you want to run an Applesoft program with Memory Master in place, it is a good idea to set HIMEM:32768 before doing so, especially if the Applesoft program does any string manipulation. The safest thing to do in any case is to BRUN Memory Master just before using it.

## ENTERING THE PROGRAM

Type in the hex codes from Listing 1, and save the program with

BSAVE MEMORY.MASTER, A\$8000, L\$14F2

Due to the excessive length of the source code for this program, we have chosen not to publish it. If you would like a copy of it, simply send a self-addressed stamped envelope to:

Nibble Memory Master

52 Domino Drive

Concord, MA 01742

and we'll send the source code to you at no cost.

### THE JUNE 1990 DISK CONTAINS THIS PROGRAM

If you'd rather not type in the listing for this program, you can buy it on disk, complete, free of typos and ready to run. *Nibble's* June 1990 programs are available on a single disk for an introductory price of \$12.95 from *Nibble*, 52 Domino Dr., Concord, MA 01742. Add \$2.50 for shipping/handling within the U.S. and Canada; \$7.50 for overseas air mail. Introductory price expires 8/31/90; after that date, the price will be \$16.95. See the *Nibble Software Directory* in this issue for ordering information. ORDER NO.: W32

## LISTING 1: MEMORY.MASTER

Start: 8000

Length: 14F2

```
76 8000:20 58 FF BA CA 18 BD 00
3C 8008:01 69 1D 8D F6 03 E8 BD
08 8010:00 01 69 00 8D F7 03 A9
1C 8018:4C 8D F5 03 4C D0 03 48
40 8020:A9 15 20 ED FD AD 27 B5
51 8028:D8 9D CA 94 CA 10 F8 A9
26 8030:00 85 DA 85 F5 85 F1 85
6D 8038:F2 85 E9 85 EA 85 DD 85
6A 8040:FC A9 08 85 DE 85 FD A9
3A 8048:FF 85 FE A9 BF 85 FF AD
63 8050:F2 03 CD F6 03 D0 07 68
71 8058:20 B5 85 4C E9 80 8D C6
B4 8060:94 AD F3 03 8D C7 94 AD
83 8068:F6 03 8D F2 03 AD F7 03
C8 8070:8D F3 03 49 A5 8D F4 03
F7 8078:20 B5 85 68 C9 24 F0 1A
5F 8080:C9 53 D0 03 4C EF 82 C9
1C 8088:52 D0 03 4C CB 85 20 9E
A8 8090:87 2C F6 90 20 F8 8E 4C
1F 8098:5F 8D A0 01 C8 B9 00 02
8A 80A0:F0 29 C9 B8 D0 F6 C8 B9
5F 80A8:00 02 D0 FA 99 02 02 88
45 80B0:B9 00 02 99 02 02 C9 B8
27 80B8:D0 F5 A9 44 99 00 02 C8
C1 80C0:A9 45 99 00 02 C8 A9 46
18 80C8:99 00 02 C0 03 90 BF A0
C6 80D0:FF C8 20 B1 00 F0 02 09
3E 80D8:80 99 00 02 D0 F3 A0 00
C3 80E0:20 D8 8D C9 39 F0 05 D0
DA 80E8:A5 20 7D 8D A2 F8 9A 20
37 80F0:1C 88 20 AD 87 20 54 88
74 80F8:20 AE 88 C9 C9 F0 04 C9
F3 8100:8B D0 03 4C 94 81 C9 CA
5E 8108:F0 04 C9 88 D0 03 4C CF
4D 8110:81 C9 CB F0 04 C9 95 D0
99 8118:06 20 BA 88 4C F8 80 C9
DE 8120:CD F0 04 C9 8A D0 03 4C
41 8128:05 82 C9 C8 D0 03 4C 1F
D4 8130:82 C9 D4 D0 03 4C 8F 82
```

```
32 8138:C9 C6 D0 03 4C 28 88 C9
B3 8140:C2 D0 03 4C 3E 88 C9 D1
49 8148:D0 06 20 58 FC 4C 5F 8D
49 8150:C9 D3 D0 03 4C EF 82 C9
06 8158:C3 D0 0E A5 DB 85 3C A5
42 8160:DC 85 3D 20 BA FC 4C B5
46 8168:83 C9 89 D0 05 85 F1 4C
B3 8170:75 84 C9 84 D0 03 4C 99
74 8178:84 C9 92 D0 03 4C F1 88
F3 8180:C9 D2 D0 03 4C CB 85 C9
A7 8188:CC D0 03 4C EF 8D 20 9E
E6 8190:87 4C F8 80 A5 25 C9 04
99 8198:B0 27 20 27 89 38 A5 DD
90 81A0:E9 08 85 3C A5 DE E9 00
C3 81A8:85 3D C9 C0 D0 02 C6 3D
EF 81B0:20 AD 87 20 35 89 A9 03
DB 81B8:20 5B FB 20 61 88 4C F8
B4 81C0:80 20 78 88 6C 25 20 22
30 81C8:FC 20 61 88 4C F8 80 A5
6B 81D0:24 C9 05 D0 1F 20 78 88
EE 81D8:A9 1A 85 24 A9 26 85 F6
68 81E0:A5 25 C9 03 D0 06 20 27
96 81E8:89 4C 9D 81 C6 25 20 22
9D 81F0:FC 4C FF 81 20 78 88 C6
EA 81F8:24 C6 24 C6 24 C6 F6 20
B2 8200:61 88 4C F8 80 A5 25 C9
CE 8208:12 D0 06 20 3E 89 4C F8
95 8210:80 20 78 88 E6 25 20 22
ED 8218:FC 20 61 88 4C F8 80 20
9E 8220:23 89 20 85 88 2C 2A 90
81 8228:20 F8 8E 20 30 89 20 87
2B 8230:89 20 AE 88 20 5C 89 90
42 8238:03 4C E2 82 48 E6 24 20
9E 8240:ED FD 20 AE 88 20 5C 89
25 8248:90 08 68 C6 24 C6 24 4C
8F 8250:E2 82 8D 01 02 20 ED FD
C3 8258:68 8D 00 02 C6 24 C6 24
40 8260:C6 24 A9 8D 8D 02 02 A0
B7 8268:00 20 D8 8D A5 3E 85 F9
B0 8270:24 F1 10 15 20 98 89 20
B3 8278:BA 89 20 72 89 20 7D 8D
84 8280:20 23 89 20 AD 87 4C 2B
66 8288:82 20 6F 89 4C 31 82 20
ED 8290:23 89 20 85 88 2C 15 94
7B 8298:20 F8 8E 20 0C FD C9 D3
99 82A0:D0 04 A9 FF D0 0D C9 C3
7C 82A8:F0 07 C9 9B D0 ED 4C E9
A7 82B0:80 A9 7F 85 D8 20 85 88
D1 82B8:2C 6A 90 20 F8 8E 20 30
5D 82C0:89 20 87 89 20 AE 88 C9
B8 82C8:A0 90 17 25 D8 85 F9 E6
AB 82D0:24 20 DA FD C6 24 C6 24
CF 82D8:C6 24 A4 F6 20 6F 89 4C
84 82E0:C4 82 20 23 89 20 86 8D
CB 82E8:A9 00 85 F1 4C F8 80 A9
02 82F0:02 20 5B FB 20 8E FD 20
01 82F8:42 FC A2 00 86 EB A9 02
12 8300:20 5B FB 2C 62 91 20 F8
E1 8308:8E A6 DA F0 32 A5 24 85
26 8310:EC A0 00 24 FB 30 10 B9
8A 8318:80 02 20 ED FD C8 CA D0
51 8320:F6 A5 EC 85 24 D0 18 A9
9E 8328:A4 20 ED FD B9 80 02 20
A2 8330:DA FD A9 A0 20 ED FD C8
56 8338:CA D0 F1 A5 EC 85 24 20
52 8340:84 8E E0 00 D0 0D A6 DA
3D 8348:D0 06 20 9E 87 4C FE 82
59 8350:4C AA 83 A0 00 84 DA AD
BC 8358:00 02 C9 A4 F0 1A 84 FB
35 8360:B9 00 02 C9 8D D0 03 4C
63 8368:AA 83 C9 C0 90 02 29 DF
28 8370:99 80 02 C8 E6 DA D0 E8
07 8378:85 FB A0 00 C8 B9 00 02
52 8380:C9 8D D0 02 F0 EF 20 D8 8D
6C 8388:A0 D0 02 F0 EF 20 D8 8D
F2 8390:C9 99 F0 0A C9 C6 F0 D6
68 8398:20 9E 87 4C FE 82 A6 DA
BE 83A0:A5 3E 9D 80 02 E6 DA 88
79 83A8:D0 D3 20 02 8B A6 FC 86
52 83B0:3C A6 FD 86 3D A6 FE 86
2F 83B8:3E A6 FF 86 3F E6 3E D0
0F 83C0:02 E6 3F A6 DA 86 D9 A0
C7 83C8:00 A2 00 24 FB 30 3F BD
4B 83D0:80 02 C9 AA F0 23 B1 3C
08 83D8:C9 A0 90 08 C9 E0 90 14
2D 83E0:29 DF B0 10 C9 20 90 0C
AD 83E8:C9 60 90 06 C9 80 B0 04
F2 83F0:29 DF 09 80 DD 80 02 D0
76 83F8:23 C8 E8 C6 D9 D0 00 4C
15 8400:5A 84 4C 1C 84 C8 E8 C6
D9 8408:D9 D0 03 4C 5A 84 BD 80
1C 8410:02 C9 AA F0 F0 D1 3C F0
36 8418:EC 4C 1C 84 20 BA FC B0
9B 8420:0A A5 3D C9 C0 D0 9C E6
D2 8428:3D D0 98 24 EB 10 17 A9
A5 8430:02 20 5B FB 20 8E FD 20
B6 8438:42 FC 2C 21 92 20 F8 8E
85 8440:20 97 8B 4C E9 80 A9 02
EC 8448:20 5B FB 20 8E FD 20 42
29 8450:FC 2C C4 91 20 F8 8E 4C
AD 8458:3A 84 A2 FF 86 EB A5 3C
CC 8460:85 DB A5 3D 85 DC 20 B5
BA 8468:85 20 1C 88 20 AD 87 20
17 8470:91 88 4C F8 80 20 98 89
CB 8478:A5 DF 85 E1 A5 E0 85 E2
82 8480:20 23 89 20 A9 8B 20 8F
34 8488:8D 20 85 88 A9 00 85 D9
1B 8490:2C 95 92 20 F8 8E 4C 2B
F2 8498:82 20 98 89 A5 DF 85 E7
B9 84A0:A5 E0 85 E8 20 58 8D 20
83 84A8:23 89 20 A9 8B 20 41 8D
25 84B0:90 06 20 9E 87 4C 16 85
53 84B8:20 30 89 20 87 89 20 85
00 84C0:88 2C 04 93 20 F8 8E A9
F3 84C8:00 85 D9 20 30 89 20 87
1C 84D0:89 20 AE 88 C9 A0 90 34
0D 84D8:D0 F7 E6 D9 A5 DF 85 DB
06 84E0:A5 E0 85 DC A0 01 B1 DB
D0 84E8:88 91 DB A5 DB C5 EE A5
6B 84F0:DC E5 EF E6 DB D0 02 E6
38 84F8:DC 90 E9 20 58 8D 20 41
82 8500:8D B0 09 20 7D 8D 20 AD
00 8508:87 4C CB 84 24 F0 10 06
4D 8510:20 6B 8C 20 86 8D 38 A5
2D 8518:EE E5 D9 85 EE A5 EF E9
D1 8520:00 85 EF 20 86 8D A9 00
70 8528:85 E9 85 EA 4C F8 80 20
C0 8530:9E 87 20 85 88 24 EA 10
D9 8538:08 2C AA 90 20 F8 8E F0
09 8540:06 2C 46 93 20 F8 8E 20
38 8548:97 8B 20 30 89 60 A5 DD
F0 8550:C5 E3 A5 DE E5 E4 B0 20
B1 8558:A5 E3 85 3C A5 E4 85 3D
5C 8560:A5 EE 85 3E A5 EF 85 3F
A1 8568:A5 DD 85 42 A5 DE 85 43
42 8570:A0 00 20 2C FE 4C E9 80
E2 8578:38 A5 DD E5 E3 85 E1 A5
0D 8580:DE E5 E4 85 E2 18 A5 FE
9A 8588:65 E1 85 DF A5 FF 65 E2
AE 8590:85 E0 A0 00 B1 FE 91 DF
88 8598:A5 FC C5 FE A5 FD E5 FF
80 85A0:A5 FE D0 02 C6 FF C6 FE
49 85A8:A5 DF D0 02 C6 FF C6 DF
25 85B0:90 E0 4C E9 80 20 39 FB
BA 85B8:20 93 FE 20 89 FE 20 58
E9 85C0:FC 2C 21 8F 20 F8 8E 20
E7 85C8:0A 89 60 20 0A 89 A9 FF
EE 85D0:85 F5 A9 02 20 5B FB 20
2F 85D8:8E FD 20 42 FC 2C A3 93
7D 85E0:20 F8 8E 20 02 8B A5 FC
D4 85E8:85 E3 A5 FD 85 E4 A5 FE
AD 85F0:85 EE A5 FF 85 EF A9 0A
64 85F8:20 5B FB 2C 8D 93 20 F8
C0 8600:8E 20 95 8D A5 3E 85 DD
1B 8608:A5 3F 85 DE A9 0C 20 5B
AA 8610:FB 2C 5C 94 20 F8 8E A9
AE 8618:00 85 FA 20 0C FD C9 D2
89 8620:F0 15 C9 CD D0 03 4C 4E
25 8628:85 C9 C6 D0 03 4C 58 85
82 8630:C9 9B D0 D8 4C E9 80 A9
3D 8638:0E 20 5B FB 2C E1 93 20
74 8640:F8 8E A5 24 85 EC A6 E3
80 8648:A5 E4 20 41 F9 A5 EC 85
67 8650:24 20 95 8D 8A F0 08 A5
FB 8658:3E 85 E3 A5 3F 85 E4 38
E4 8660:A5 E3 E5 FC 85 DF A5 E4
E3 8668:E5 FD 85 E0 A9 10 20 5B
EE 8670:FB 2C 34 94 20 F8 8E A9
```

```

29 8678:00 85 F4 20 0C FD C9 C1
F1 8680:F0 27 C9 D0 F0 07 C9 9B
64 8688:D0 F1 4C E9 80 A9 FF 85
3F 8690:F4 A9 0E 20 5B FB 20 42
22 8698:FC 2C 52 94 20 F8 8E 2C
51 86A0:97 91 20 F8 8E 20 95 8D
01 86A8:8A F0 35 A5 3E 85 E3 A5
18 86B0:3F 85 E4 2C AE 91 20 F8
C2 86B8:8E 20 95 8D A5 3E 85 EE
DF 86C0:A5 3F 85 EF A5 E3 C5 EE
8F 86C8:A5 E4 E5 EF 90 0C 2C FE
B1 86D0:91 20 F8 8E 20 97 8B 4C
F3 86D8:91 86 20 3A 87 4C 91 86
42 86E0:18 A5 FC 65 DF 85 E3 A5
C4 86E8:FD 65 E0 85 E4 18 A5 FE
43 86F0:65 DF 85 EE A5 FF 65 E0
3C 86F8:85 EF A9 0F 20 5B FB 20
C7 8700:42 FC 2C F7 93 20 F8 8E
EB 8708:20 0C FD C9 CE F0 0E C9
DD 8710:D9 F0 06 C9 9B D0 F1 F0
69 8718:12 A9 FF 85 FA 24 F4 30
02 8720:03 20 3A 87 24 FA 10 03
87 8728:4C 4E 85 A5 E3 85 3C A5
B6 8730:E4 85 3D A9 00 85 F4 4C
1F 8738:E9 80 38 A5 DD E5 FC 85
4C 8740:E1 A5 DE E5 FD 85 E2 A5
C0 8748:E3 85 E5 A5 E4 85 E6 E6
1A 8750:FE D0 02 E6 FF A0 00 B1
F9 8758:E5 20 8E F8 A6 2F E0 02
88 8760:D0 2F 20 29 8D B1 E5 85
40 8768:E7 C8 B1 E5 85 E8 A5 E7
4F 8770:C5 FC A5 E8 E5 FD 90 1D
B1 8778:A5 E7 C5 FE A5 E8 E5 FF
03 8780:B0 13 A5 E7 65 E1 A0 00
4A 8788:91 E5 A5 E8 65 E2 C8 91
E0 8790:E5 E0 00 F0 03 29 8D
6F 8798:20 29 8D 90 B8 60 A9 A0
2B 87A0:A0 80 AA CA D0 FD 2C 30
97 87A8:C0 88 D0 F6 00 A9 02 20
8D 87B0:5B FB A9 00 85 24 A5 3C
77 87B8:29 F8 85 C3 85 DD A5 3D
6E 87C0:85 DE C9 C0 D0 02 E6 DE
05 87C8:A5 3C 18 69 07 85 3E A5
A7 87D0:3D 69 00 85 3F C9 C0 D0
4C 87D8:04 E6 3D E6 3F 20 92 FD
58 87E0:A0 00 A9 A0 20 ED FD B1
64 87E8:3C 20 DA FD 20 BA FC 90
51 87F0:F1 A2 02 D0 A4 F9 38 A5
50 87F8:3C E9 08 85 3C A5 3D E9
F1 8800:00 85 3D B1 3C 09 80 C9
34 8808:A0 B0 02 A9 AE 20 ED FD
1D 8810:20 BA FC 90 EE A5 25 C9
15 8818:12 D0 AD 60 A9 13 20 87
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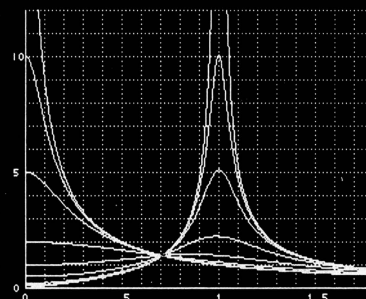
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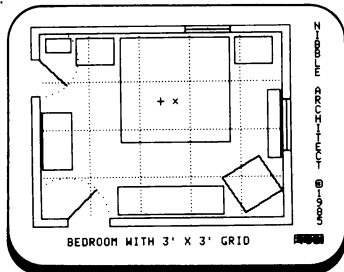
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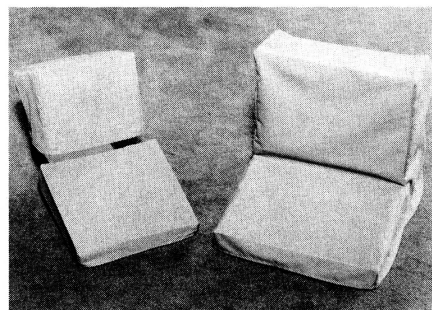
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 4F 9308:C1 C3 C5 BE A0 C4 C5 CC  
 D7 9310:C5 D4 C5 D3 A0 C2 D9 D4  
 F8 9318:C5 A0 C1 D4 A0 C3 D5 D2  
 1D 9320:D3 CF D2 AE AE AE 8D BC  
 33 9328:D2 C5 D4 D5 D2 CE BE A0  
 D2 9330:C5 D8 C9 D4 D3 A0 D4 CF  
 3C 9338:A0 C3 D5 D2 D3 CF D2 A0  
 FE 9340:CD CF C4 C5 AE 00 CF CE  
 12 9348:C5 A0 CF D2 A0 CD CF D2  
 12 9350:C5 A0 C2 D2 C1 CE C3 C8  
 C7 9358:C5 D3 A0 C1 D4 A0 CC C9  
 2B 9360:CD C9 D4 AE A0 C1 CE D9  
 CD 9368:A0 CD CF D2 C5 8D C9 CE  
 2D 9370:D3 C5 D2 D4 C9 CF CE D3  
 F0 9378:A0 D7 C9 CC CC A0 C3 D2  
 C6 9380:C5 C1 D4 C5 A0 C5 D2 D2  
 FA 9388:CF D2 D3 AE 00 8D C4 C5  
 6F 9390:D3 D4 C9 CE C1 D4 C9 CF  
 BD 9398:CE A0 A8 C8 C5 D8 A9 BA  
 51 93A0:A0 A4 00 8D D2 C5 CC CF  
 C1 93A8:C3 C1 D4 C5 AF CD CF D6  
 3D 93B0:C5 A0 C2 CC CF C3 CB A0  
 EA 93B8:CF C6 A0 CD C5 CD CF D2  
 EA 93C0:D9 BA A0 00 8D CE C5 D7  
 E3 93C8:A0 D3 C3 D2 C5 C5 CE A0  
 BE 93D0:D3 D4 C1 D2 D4 A0 C1 C4  
 01 93D8:C4 D2 C5 D3 D3 BA A0 A4  
 E9 93E0:00 8D A0 D0 D2 C5 D3 C5  
 A7 93E8:CE D4 A0 CC CF C3 C1 D4  
 80 93F0:C9 CF CE BA A0 A4 00 8D  
 31 93F8:8D CD CF D6 C5 A0 D4 CF  
 65 9400:A0 C4 C5 D3 D4 C9 CE C1  
 09 9408:D4 C9 CF CE BF A0 A8 D9  
 4A 9410:AF CE A9 A0 00 8D C8 C9  
 E1 9418:C7 C8 A0 C2 C9 D4 A0 D3  
 FE 9420:C5 D4 A0 CF D2 A0 C3 CC  
 5B 9428:C5 C1 D2 BF A0 A8 D3 AF  
 F0 9430:C3 A9 A0 00 8D D2 C5 CC  
 B9 9438:CF C3 C1 D4 C5 A0 C1 CC  
 49 9440:CC A0 CF D2 A0 D0 C1 D2  
 39 9448:D4 BF A0 A8 C1 AF D0 A9  
 F3 9450:A0 00 8D D3 C5 C7 CD C5  
 A7 9458:CE D4 BA 00 8D D2 A9 C5  
 0D 9460:CC CF C3 C1 D4 C5 AC A0  
 5D 9468:CD A9 CF D6 C5 AC A0 CF  
 19 9470:D2 A0 C6 A9 C9 CC CC BA  
 44 9478:A0 00 8D BC C5 D3 C3 BE  
 22 9480:A0 D4 CF A0 C5 D8 C9 D4  
 96 9488:A0 AD A0 BC D3 D0 C1 C3  
 AE 9490:C5 BE A0 D4 CF A0 D3 C9  
 59 9498:CE C7 CC C5 AD D3 D4 C5  
 4C 94A0:D0 8D 8D A0 A0 C1 CE  
 9A 94A8:D9 A0 CF D4 C8 C5 D2 A0  
 88 94B0:C8 C5 D9 A0 D4 CF A0 D3  
 65 94B8:D4 CF D0 A0 C1 CE C4 A0  
 85 94C0:D3 D4 C1 D2 D4 00 00 00  
 A3 94C8:00 00 00 00 00 00 00 00  
 0A 94D0:00 00 00 00 00 00 00 00  
 19 94D8:00 00 00 00 00 00 00 00  
 DA 94E0:00 00 00 00 00 00 00 00  
 0B 94E8:00 00 00 00 00 00 00 00  
 2B 94F0:00 00

TOTAL: 2A01

END OF LISTING 1

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# WHODUNIT

**Examine the clues  
and finger the  
murderer**

**D**id you hear that scream? Someone has discovered the body of Sylvester Sidebottom. The local police are turning to you, a weekend guest on Lord Kingsley's estate, to help solve the crime. Are you an amateur sleuth in an Agatha Christy novel? No, you are playing Whodunit.

Whodunit, as the name implies, is a crime-solving game. The victim is the same each time the game is played, but the computer assigns a different murderer, weapon, and crime location every game. The player must guess the solution.

You might, for instance, figure that Emma Ellsworth, the maid, used the dagger to kill Sylvester in the parlor. The program responds with evaluations of your choices. Through the process of elimination and logic, you'll solve the crime as you might in the popular board game Clue.

## USING THE PROGRAM

Whodunit is a self-explanatory program. When you run Whodunit, you'll be given a set of sample instructions, and have access to some facts about the crime. Other facts will be withheld. Your job is to uncover those and guess the identity of the killer.

## ENTERING THE PROGRAM

Type in the program from Listing 1 and save it with the command

SAVE WHODUNIT

For help entering *Nibble* listings, see the Typing Tips section.

## HOW THE PROGRAM WORKS

Lines 110-200 contain the graphics for the program title. The setting for the crime with descriptions of the characters is in lines 280-370. Lines 390-410 direct the computer to choose the variables randomly. (Note the HGR2 statement in line 90. Putting the Hi-Res graphics on page 2 gets them out of the way and prevents chopping off the end of the program.)

In lines 450-550 the player receives a clue which might or might not be helpful. Simple IF-THEN statements reveal the sex of the murderer, the nature of the weapon (with the appearance or omission of the word "bloody"), and the floor location of the room. Some facts, such as the sex of the hooded stranger, remain the game's secret.

Line 480 slows down the printing so the clue can be read and Line 550 erases it as soon as it is complete.

The player is given simple instructions (lines 580-600), followed by a list of choices for guessing (lines 630-730).

(When I wrote "Whodunit" I numbered the choices and had the player type in the numbers for his guess. I changed that system when I heard my family guessing numbers as they played, and paying no attention to the story angle.)

Lines 740-990 let you enter guesses and lines 1010-1210 give the player a check for error. You can change a guess, with no effect on your performance, until you verify it.

The program evaluates your guesses and tells you if any or all of them are correct (lines 1240-1370). You can study your guess and the evaluation of it as long as you want. Any keypress sends you back to line 620 to guess again.

The winning routine with description of the correct solution is in lines 1390-1630. This is followed by an option to replay, with a new crime.

*Constance Fairbanks, 9462 Canfield Drive, La Habra, CA 90631. This program is compatible with DOS 3.3 and ProDOS.*

SUSPECTS	WEAPONS	LOCATIONS
BUTLER	KNIFE	BEDROOM
KINGSLY	SPEAR	KITCHEN
VICTIM	POISON	LIBRARY
MAID	ROPE	DINING ROOM
LADY K.	DAGGER	PARLOR
STRANGER	GUN	GUN ROOM

WHO COMMITTED THE CRIME? B  
WITH WHICH WEAPON? K  
WHERE? K

THE BUTLER  
DID IT WITH  
THE KNIFE IN THE  
KITCHEN.

IS THIS YOUR GUESS? Y

TWO THIRDS OF YOUR GUESS IS RIGHT.PRESS RETURN  
TO TRY AGAIN.

Figure 1: Sample guess

## MODIFICATIONS

As a veteran elementary school teacher, I recognize a learning device for promoting logical thinking. If you want a program for young children, you might convert it to "What's in the box?" using numbers, color words, and objects as variables. Clues might include descriptive words and categories (many, few, big, little, toys, pets, and so on). Graphics could be added to reveal correct answers.

## LISTING 1: WHODUNIT

```

37 10 REM *****
C0 20 REM * WHODUNIT *
B9 30 REM * BY CONSTANCE FAIRBANKS *
AE 40 REM * COPYRIGHT (C) 1990 *
CB 50 REM * MINDCRAFT PUBL. CORP. *
24 60 REM * CONCORD, MA 01742 *
45 70 REM *****
3A 80 REM
22 90 PRINT CHR$(21): HGR2
B9 100 HCOLOR= 7
24 110 HPLLOT 25,30 TO 35,70 TO 45,40 TO 55,70 TO
    65,30
E7 120 HPLLOT 75,30 TO 75,70: HPLLOT 75,50 TO 95,50
    : HPLLOT 95,30 TO 95,70
D0 130 HPLLOT 105,40 TO 115,30 TO 125,40 TO 125,60
    TO 115,70 TO 105,60 TO 105,40
DF 140 HPLLOT 135,30 TO 145,30 TO 155,40 TO 155,60
    TO 145,70 TO 135,70 TO 135,30
7E 150 HPLLOT 165,30 TO 165,70 TO 185,70 TO 185,30
43 160 HPLLOT 195,70 TO 195,30 TO 215,70 TO 215,30
5C 170 HPLLOT 225,30 TO 225,70
64 180 HPLLOT 235,30 TO 255,30: HPLLOT 245,30 TO 24
    5,70
4F 190 HPLLOT 125,90 TO 135,80 TO 145,80 TO 155,90
    TO 155,100 TO 139,110 TO 139,130
4B 200 HPLLOT 139,136 TO 141,138 TO 139,140 TO 137
    ,138 TO 139,136
D1 210 FOR P = 1 TO 2000: NEXT P
E6 220 TEXT : HOME
B7 230 HTAB 10: PRINT "A CRIME SOLVING GAME"
9B 240 PRINT : PRINT TAB( 11)"BY CONNIE FAIRBANK
    S"

```

```

B2 250 HTAB 4: PRINT "(C) 1990 MINDCRAFT PUBL. CO
    RP."
B9 260 REM ? SETTING ?
5F 270 PRINT
3E 280 PRINT "HERE IS YOUR CHANCE TO DISPLAY YOUR
    PROWESS AS AN AMATEUR DETECTIVE. WHIL
    E YOU ARE VISITING ON THE COUNTRY ESTATE":
    REM 5 AND 2 SPACES
DF 290 PRINT "OF LORD WILLIAM KINGSLY A CRIME WIL
    L BE COMMITTED. THE LOCAL POLICE TURN TO Y
    OUFOR YOUR GUESSES AS TO THE CRIMINAL, THEW
    EAPON, AND THE SITE OF THE CRIME."
A0 300 PRINT : PRINT "INCLUDING LORD KINGSLY THER
    E ARE SIX POSSIBLE SUSPECTS. LADY KINGSLY,
    A MOSTGRACIOUS HOSTESS, IS OBVIOUSLY":
    REM 4 SPACES
CE 310 PRINT "DISSATISFIED WITH HER MARRIAGE AND
    IN LOVE WITH SYLVESTER SIDEBOTTOM, A
    WEEKEND HOUSEGUEST.": REM 3 AND 7 SPACES
B7 320 PRINT : PRINT "PRESS RETURN ";K$
EC 330 GET K$: HOME
4C 340 PRINT : PRINT "THE MAID'S NAME IS EMMA ELL
    SWORTH. YOU HAVE NOTICED HER SNEAKING OUT
    OF A GUESTROOM LATE AT NIGHT."
3B 350 PRINT
92 360 PRINT "SEBASTION, THE BUTLER, HAS JUST ANS
    WEREDTHE DOOR AND ADMITTED A STRANGER DRESS
    EDIN A HOODED PURPLE CAPE."
51 370 PRINT "DON'T OVERLOOK THE VICTIM AS A SUSP
    ECT. IT MIGHT HAVE BEEN SUICIDE.": PRINT
9F 380 REM ? GENERATING CRIME ?
18 390 M = INT (6 * RND (1)) + 1
86 400 W = INT (6 * RND (1)) + 1
08 410 L = INT (6 * RND (1)) + 1
CB 420 PRINT "DID YOU HEAR THAT SCREAM? THE BODY
    OF SYLVESTER SIDEBOTTOM HAS BEEN DISCOVER
    EDAND NOW YOUR WORK BEGINS."
F4 430 PRINT
B7 440 REM ? CLUETIME ?
7A 450 PRINT : PRINT "PUSH RETURN TO GET AN IMPO
    RTANT CLUE. READ IT CAREFULLY FOR THIS IS
    THE ONLY TIME YOU WILL SEE IT.":C$
88 460 PRINT
66 470 GET C$
A4 480 SPEED= 50
C2 490 IF M < 4 THEN PRINT "THE MURDERER LEFT HI
    S "
DC 500 IF M > 3 THEN PRINT "THE MURDERER LEFT HE
    R "
FF 510 IF W < 4 THEN PRINT "FINGERPRINTS IN THE
    BLOODY "
73 520 IF W > 3 THEN PRINT "FINGERPRINTS IN THE
    "
33 530 IF L < 3 THEN PRINT "GROUND FLOOR ROOM."
D1 540 IF L > 2 THEN PRINT "UPSTAIRS ROOM."
98 550 SPEED= 255: HOME
03 560 REM ? INSTRUCTIONS ?
B1 570 G = 0
60 580 PRINT "ANSWER THE POLICEMAN'S QUESTIONS WI
    TH THE FIRST LETTER OF YOUR GUESS AND PRE
    SSTHE RETURN KEY."
FF 590 PRINT
E7 600 PRINT "NOW PRESS RETURN TO REVEAL POSSIBL
    E SUSPECTS, WEAPONS AND SITES.":K$: REM
    4 SPACES
91 610 GET K$: HOME
B2 620 REM ? CHOICES ?
C5 630 HOME
5E 640 INVERSE
8D 650 PRINT "SUSPECTS WEAPONS LOCATIONS":
    REM 4 AND 4 SPACES
C8 660 NORMAL
B8 670 PRINT
20 680 PRINT "BUTLER KNIFE BEDROOM": RE
    M 6 AND 6 SPACES
6B 690 PRINT "KINGSLY SPEAR KITCHEN": RE
    M 5 AND 6 SPACES
B1 700 PRINT "VICTIM POISON LIBRARY": RE
    M 6 AND 5 SPACES
F3 710 PRINT "MAID ROPE DINING ROOM"
    : REM 8 AND 7 SPACES
FC 720 PRINT "LADY K. DAGGER PARLOR": REM
    5 AND 5 SPACES

```

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## LISTING 1: WHODUNIT *continued*

```

34 730 PRINT "STRANGER GUN GUN ROOM":
PRINT : REM 4 AND 8 SPACES
47 740 VTAB 10: INPUT "WHO COMMITTED THE CRIME? "
:S$
D4 750 IF S$ = "B" THEN S = 1
36 760 IF S$ = "K" THEN S = 2
F7 770 IF S$ = "V" THEN S = 3
5B 780 IF S$ = "M" THEN S = 4
E1 790 IF S$ = "L" THEN S = 5
DA 800 IF S$ = "S" THEN S = 6
08 810 IF S > 0 AND S < 7 THEN GOTO 830
05 820 GOTO 740
19 830 VTAB 12: INPUT "WITH WHICH WEAPON? ";A$
08 840 IF A$ = "K" THEN A = 1
F9 850 IF A$ = "S" THEN A = 2
82 860 IF A$ = "P" THEN A = 3
D0 870 IF A$ = "R" THEN A = 4
0C 880 IF A$ = "D" THEN A = 5
E9 890 IF A$ = "G" THEN A = 6
B6 900 IF A > 0 AND A < 7 THEN GOTO 920
4C 910 GOTO 830
F5 920 VTAB 14: INPUT "WHERE? ";R$
DA 930 IF R$ = "B" THEN R = 1
D5 940 IF R$ = "K" THEN R = 2
1D 950 IF R$ = "L" THEN R = 3
2C 960 IF R$ = "D" THEN R = 4
C4 970 IF R$ = "P" THEN R = 5
B7 980 IF R$ = "G" THEN R = 6
57 990 IF R > 0 AND R < 7 THEN GOTO 1010
32 1000 GOTO 920
C6 1010 PRINT : IF S = 1 THEN PRINT "THE BUTLER
"
AD 1020 IF S = 2 THEN PRINT "LORD KINGSLEY "
B3 1030 IF S = 3 THEN PRINT "SYLVESTER"
3D 1040 IF S = 4 THEN PRINT "EMMA, THE MAID, "
5F 1050 IF S = 5 THEN PRINT "LADY KINGSLEY "
27 1060 IF S = 6 THEN PRINT "THE STRANGER "
3B 1070 PRINT "DID IT WITH "
0D 1080 IF A = 1 THEN PRINT "THE KNIFE IN THE"
E4 1090 IF A = 2 THEN PRINT "THE SPEAR IN THE"
12 1100 IF A = 3 THEN PRINT "THE POISON IN THE"
59 1110 IF A = 4 THEN PRINT "THE ROPE IN THE"
8B 1120 IF A = 5 THEN PRINT "THE DAGGER IN THE"
04 1130 IF A = 6 THEN PRINT "THE GUN IN THE"
9A 1140 IF R = 1 THEN PRINT "BEDROOM."
8B 1150 IF R = 2 THEN PRINT "KITCHEN."
D8 1160 IF R = 3 THEN PRINT "LIBRARY."
DA 1170 IF R = 4 THEN PRINT "DINING ROOM."
7B 1180 IF R = 5 THEN PRINT "PARLOR."
94 1190 IF R = 6 THEN PRINT "GUN ROOM."
C7 1200 PRINT : INPUT "IS THIS YOUR GUESS? ";A$
83 1210 IF A$ < > "Y" THEN 620
51 1220 G = G + 1
77 1230 REM ? ANALYSE GUESS ?
CE 1240 X = 0
29 1250 IF S = M THEN X = X + 1
CB 1260 IF A = W THEN X = X + 1
9F 1270 IF R = L THEN X = X + 1
53 1280 IF X = 0 THEN 1320
0C 1290 IF X = 1 THEN 1340
27 1300 IF X = 2 THEN 1360
B8 1310 IF X = 3 THEN 1380
74 1320 PRINT : PRINT "SORRY, ALL THREE PARTS OF
YOUR GUESS WERE WRONG. PRESS RETURN TO
TRY AGAIN.";Z$: REM 4 SPACES
0E 1330 GET Z$: GOTO 620
B6 1340 PRINT : PRINT "ONE THIRD OF YOUR GUESS IS
RIGHT. PRESS RETURN TO TRY AGAIN.";Z$
AE 1350 GET Z$: GOTO 620
22 1360 PRINT : PRINT "TWO THIRDS OF YOUR GUESS I
S RIGHT. PRESS RETURN TO TRY AGAIN.";Z$
76 1370 GET Z$: GOTO 620
3A 1380 REM ? WINNING ROUTINE ?
2A 1390 HOME
57 1400 PRINT "CONGRATULATIONS! YOU SOLVED THE MY
STERY."
39 1410 REM ? SOLUTION ?
75 1420 IF M = 1 THEN PRINT "THE BUTLER DID IT.
HE USED THE"
4D 1430 IF M = 2 THEN PRINT "LORD KINGSLEY IS THE
MURDERER USING THE"
7F 1440 IF M = 3 THEN PRINT "SYLVESTER COMMITTED
SUICIDE USING THE"
C8 1450 IF M = 4 THEN PRINT "EMMA ELLSWORTH IS T

```

7A 1460 IF M = 5 THEN PRINT "LADY KINGSLEY KILLED HER LOVER AFTER SHE HAD SPIED HIM IN A PASSIONATE EMBRACE WITH EMMA. SHE SHREWDLY USED THE"

F2 1470 IF M = 6 THEN PRINT "REMOVAL OF THE STRANGER'S PURPLE CAPE REVEALED THE SHAPELY FIGURE OF BUBBLES O'TOOLE, SYLVESTER'S EX-WIFE WHO EKES OUT A BARE LIVING AS A STRIPPER. SHE GOT HER REVENGE AT LAST WITH THE"

19 1480 IF W = 1 THEN PRINT "KNIFE. IT WAS FOUND IN THE GARDEN BELOW THE WINDOW ON THE EAST SIDE OF THE"

67 1490 IF W = 2 THEN PRINT "SPEAR. THE MURDERER HAD REMOVED IT FROM ITS RACK AND PLUNGED IT IN SYLVESTER'S BACK AS HE STOOD IN THE"

8B 1500 IF W = 3 THEN PRINT "POISONED CHAMPAGNE. AFTER THE KILLER DRANK A TOAST TO THE VICTIM THE GLASSES WERE SMASHED AND THE MURDERER'S HAND WAS CUT. BLOOD WAS ALL OVER THE"

66 1510 IF W = 4 THEN PRINT "ROPE. SYLVESTER WAS FOUND HANGING FROM THE CHANDILIER IN THE"

20 1520 IF W = 5 THEN PRINT "DAGGER. THERE WERE NO BLOODY WOUNDS AS IT WAS THE HEAVY HANDLE THAT GOT SYLVESTER IN THE TEMPLE. HE LAY ON THE FLOOR OF THE": REM 8 SPACES

EF 1530 IF W = 6 THEN PRINT "GUN. THE POLICE FOUND A BULLET HOLE IN SYLVESTER AND 13 IN THE WALLS OF THE"

F4 1540 IF L = 1 THEN PRINT "COOK'S BEDROOM. BEING ON THE GROUND FLOOR MAKES IT CONVENIENT TO GET TO THE KITCHEN.: REM 5 SPACES

7F 1550 IF L = 2 THEN PRINT "KITCHEN, A SUNNY AND USUALLY HAPPY ROOM."

6A 1560 IF L = 3 THEN PRINT "LIBRARY. A COPY OF 'CRIME & PUNISHMENT' LAY OPEN AT SYLVESTER'S FEET."

4C 1570 IF L = 4 THEN PRINT "DINING ROOM. THE COOK HAD HEARD STRANGE NOISES THROUGH THE OPEN DUMB WAITER.": REM 8 AND 4 SPACES

E2 1580 IF L = 5 THEN PRINT "PARLOR. THE ROOM IS A MESS AND MUST BE CLEANED FOR PEOPLE ARE SURE TO DROP BY AFTER THE FUNERAL."

56 1590 IF L = 6 THEN PRINT "GUN ROOM. QUITE APPROPRIATE, DON'T YOU THINK?"

64 1600 PRINT

A6 1610 IF G = 1 THEN PRINT "YOU ACTUALLY SOLVED THE CRIME WITH YOUR FIRST GUESS! WE ARE RECOMMENDING YOU FOR THE JOB OF HEAD OF THE F.B.I."

04 1620 IF G > 1 AND G < 6 THEN PRINT "YOU SOLVED THE CRIME IN 'G' GUESSES. YOU ARE BEING PROMOTED TO CHIEF DETECTIVE."

2E 1630 IF G > 5 THEN PRINT "YOU TOOK 'G' GUESSES TO SOLVE THIS CRIME. SOME SLEUTH! SEE IF YOU CAN DO BETTER THIS TIME."

D7 1640 PRINT

FA 1650 INPUT "DO YOU WANT TO PLAY AGAIN?"; B\$

8F 1660 IF B\$ = "Y" THEN 220

EF 1670 PRINT

E8 1680 PRINT "COME BACK WHEN YOU WANT TO PLAY DETECTIVE AGAIN.": REM 9 SPACES

TOTAL: C207

END OF LISTING 1



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# SPELLING & GRAMMAR CHECKERS

If you own a word processing program, you have surely heard of these fantastic little utilities called spelling checkers. Hearing of them is one thing; using them is quite another.

A spelling checker, as the term is commonly defined today, compares each word in your word processing document against lists of words called dictionaries. "Dictionary" is a slight misnomer here, since these programs will not give you definitions of words. The "dictionary" in a spelling checker or current word processing program is just a list of words.

When a spelling checker discovers a word not in its list, it flags that word and brings it to your attention. That, in a nutshell, is all a spelling checker does. It does not tell you that you used "there" where you should have used "their." Both are correctly spelled words. Once the word is flagged, how you process it further is up to you.

When the program flags a word, you are usually given several choices, possibly including changing the word yourself if you know the correct spelling; asking the program for a recommended alternative spelling of the word; skipping the word; ignoring the word completely; or adding it to a "custom" dictionary.

There are certain inherent values to this process. The spelling checker is tireless. It does not get eyestrain or fatigue, and it's just as attentive at the end of your docu-

ment as it was at the beginning. It allows you more freedom to compose by letting you ignore typos. If you have a particularly troublesome word that is awkward to type, enter an intentionally misspelled very short word as a substitute for it. The first time the spelling checker encounters this word in the document, edit the word and tell the spelling checker to "replace all occurrences." This is a seldom-used but very powerful capability of spelling checkers.

Grammar checkers, on the other hand, are programmed to look for such problems as certain common mistakes in syntax; faulty use of phrases; overused, repetitive, racist, vague, or sexist words; capitalization; and punctuation errors. They are supposed to make you a more effective writer by pointing out your mistakes in these areas and allowing you to correct them to present a document conforming to current specifications or writing style preferences. They are not infallible.

Both tools are used after you have finished your first draft. They can improve your productivity by allowing you to concentrate on entering your thoughts as rapidly as you can type, leaving the proofreading and correcting chores till later.

One criterion for judging spelling checkers is the size of their dictionaries. This comparison, however, can be misleading. The method of constructing the dictionary can hide the true number of real words in that dictionary. A long list of words made up of root words and common prefixes and suffixes may contain actually fewer real words than a shorter list comprised of all real words. An overlarge dictionary can slow the search speed considerably.

Another factor is the ease with which you can add and delete words to custom dictionaries. This is important in these days of specialized terminology.

The ability to install the program to a hard disk or RAM is becoming increasingly important as memory requirements for programs increase.

The ability to customize the program to your needs and the availability of additional preprogrammed specialized word lists is also becoming more and more important.

Last, but certainly not least, are the hardware requirements for running the program.

Let us examine five currently available programs that can proofread your document for either spelling or grammar errors. For a quick summary of each products features, see Table 1.

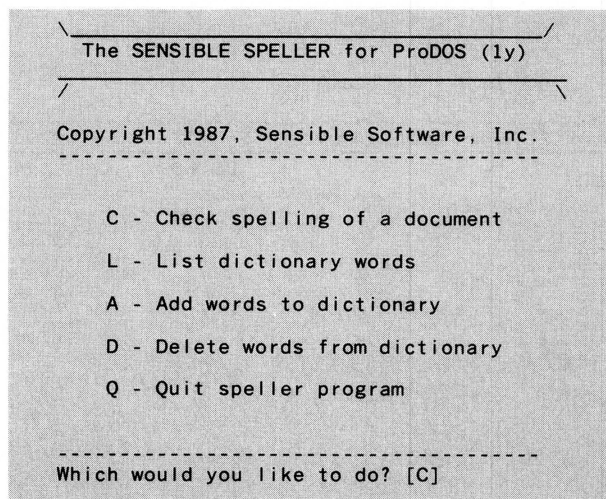


Figure 1: Sensible Speller

Frank Dooling, 7305 Monticello Blvd., Springfield, VA 22150.

Table 1: Document Checker Features List

Product	Sensible Speller	AppleWorks 3.0	Timeout: QuicksPELL	Wordbench	Sensible Grammar
Type	Standalone	Built In	Integrated	Built in	Standalone
Dictionary Size	80,000	90,000	80,000	60,000	2,000 phrases
Origin	Random House Concise Ed.	Random House Concise Ed.	Random House Concise Ed.	Oasis Systems	Empirical
Other Dicts. Available	Legal & Medical	None	None	None	None
Context Editing	Yes	Yes	Yes	Yes	Yes
Suggests Alternatives	Yes	Yes	Yes	Yes	Yes
Flags Double Words	No	Yes	Yes	No	Yes
Columns	40	80	80	80	80
Copy Protected	Yes	No	No	No	Yes
RAMdisk Use	Yes	Yes	Yes	Yes	Yes
Warranty	90 day	90 day	90 day	90 day	90 day
Comments	Comes with 3.5 & 5.25" disks	Comes with 3.5 & 5.25" disks	Comes with 3.5 & 5.25" disks	Comes with 3.5 & 5.25" disks	Comes with 3.5 & 5.25" disks

### SENSIBLE SPELLER

Sensible Speller is a standalone program that has been around for a long time. It works with many ProDOS-based word processor files and has recently been upgraded for compatibility with AppleWorks 3.0. The dictionary, which includes 80,000 words, contains the official word list from the Concise Edition of the Random House Dictionary.

Sensible Speller uses an interface similar to AppleWorks 3.0 (see Figure 1). Once the file and the desired dictionary are selected, Sensible Speller checks all of the words in the document in alphabetical order. The program displays each letter of the alphabet to indicate the progress of the search. Upon completion of an initial search, you can print out a list of suspect words, and then repeat the search with another dictionary if desired.

The only error I found was in the use of the RAMCOPY routine to copy the program from the 5.25-inch disk to a hard drive. (The 3.5-inch disk copy worked correctly.) The problem is in the DATA statements of the RAMCOPY program. The program calls for a source disk named /GRAMMAR. This works fine for the front side of the disk, but the back side of the disk is named /PHRASES. The solution to this is to go into BASIC, load the RAMCOPY program, and add to the program the line

```
2170 DATA "/phrases"
```

Type RUN and enter the correct hard disk prefix when prompted. The RAMCOPY program will then execute properly.

Since this is an older generation program, it relies heavily on the use of ProDOS pathnames. If you're comfortable with this syntax, you'll find the program easy to use. You can use all available dictionary files to process

your document simply by typing in the dictionary pathname when requested. This is not as effective as current point-and-click routines, but it is sufficient.

The documentation includes a number of screen shots and contains a tutorial called "20 Minutes to Sensible Spelling" that guides you through all necessary steps from backing up dictionary disks through demonstrating the checking of a sample file and creating a new dictionary.

Although the program's user interface may seem archaic to users of newer programs, it remains one of the few existing programs available capable of reading some of the older word processing program formats. Sensible Speller Version 1z, which should be released by publication time, is fully compatible with AppleWorks 3.0 word processing files.

### APPLEWORKS 3.0

AppleWorks 3.0 runs on all models of the Apple II computer having at least 128K of RAM. The dictionary used in the program's spelling checker is an extension of the Random House dictionary, adding 10,000 common names and terms to that dictionary's 80,000 words.

Along with the Random House dictionary, AppleWorks 3.0 uses a custom dictionary. You can choose between alternative custom dictionaries, but you must select one before checking a document. You can also edit the custom dictionary. To start the spelling checker from within AppleWorks 3.0, your document must be in memory. Then press Open-Apple-V for Verify spelling.

The AppleWorks 3.0 spelling checker performs as described in the documentation (see Figure 2). When you select Verify spelling, Apple

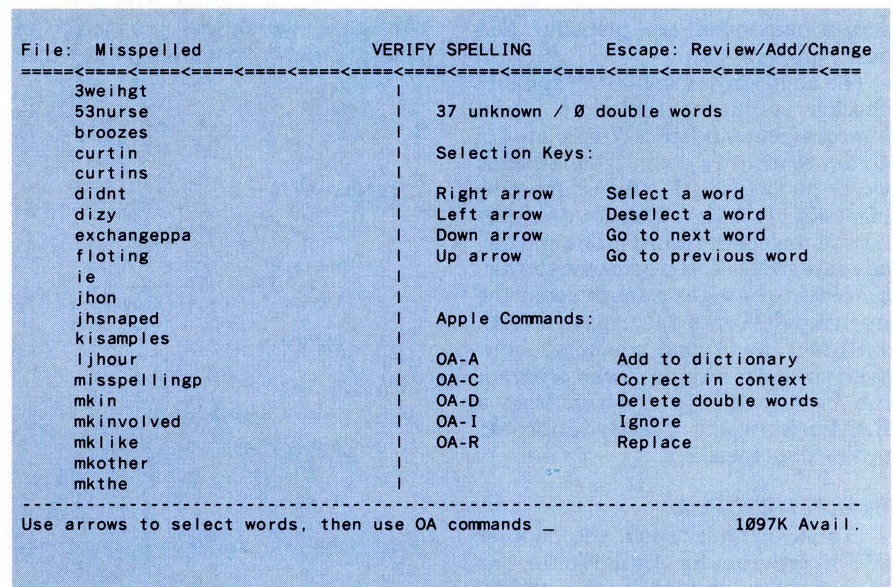


Figure 2: AppleWorks 3.0

Works displays a “thermometer” screen containing three progress indicators. The program quickly scans through the document and then scans the custom dictionary and main dictionary in that order. The program can check spelling in various ways, including from a list or in context, and will even give you a summary showing the original incorrect words along with the corrected versions. The comparison algorithm allows phonetic checking, rather than simply looking for initial letters in a given word. “Filosofikal” will result in a suggested word of “philosophical” using this program.

Like the rest of AppleWorks, the spelling checker forgives your input errors. Pressing Escape and following appropriate prompts will get you out of most normal situations. I tried many different entry and option selection errors and never did crash the program.

This area of the program is extremely easy to use. It follows the standard AppleWorks interface. If you’re already familiar with AppleWorks, you’ll have no problem with this spelling checker. One caution, however, is that you should ensure all the dictionaries you want to use are in the main AppleWorks program directory. For 5.25-inch disk users, these dictionaries should be on separate disks labeled /DICTIONARY.

The documentation for this program is extremely well done. Detailed examples usage are provided in both the AppleWorks Reference Manual and in the AppleWorks Tutorial. Illustrations containing functional flow charts and well-annotated actual screen examples are plentiful and easily understood.

The addition of the built-in spelling checker is one of the more useful improvements in AppleWorks 3.0. Its ability to identify potential misspelled words phonetically is a major improvement also, as is the capability to create lists of misspelled words. The one disadvantage is the necessity for the dictionaries to be in the same folder as the main AppleWorks 3.0 program. With sufficient additional memory, however, the entire AppleWorks program can be loaded into and run from a RAMdisk, which greatly improves processing speed.

#### TIMEOUT QUICKSPELL

TimeOut QuickSpell, the popular add-on program for AppleWorks, has been recently upgraded for compatibility with AppleWorks 3.0 files. The other prominent improvement in this

version is the new algorithm, the same as that in the built in spelling checker contained in AppleWorks 3.0. This upgrade uses the same Concise Random House Dictionary as the previous version. The program works only with AppleWorks, not with any

*You can  
configure  
QuickSpell to  
look for  
dictionaries on  
any disk.*

other word processing programs. It is easily installed in a backup copy of either AppleWorks 3.0 or 2.0 by following the instructions in the manual. As with all other TimeOut add-on programs, it is started from within AppleWorks by holding down the Open-Apple key and pressing the Escape key.

The new search algorithm allows QuickSpell to flag phonetically spelled words and find reasonable matches. Since it is compatible with earlier versions of AppleWorks as well as the new AppleWorks 3.0, this new feature is alone worth having. You can also configure QuickSpell to look for your custom dictionaries on any disk

and not just within the main AppleWorks directory. It does not create summary lists of words as AppleWorks 3.0 and Sensible Speller do.

Error-handling is very good in this new version of QuickSpell. Even if you have forgotten to configure the program to locate the dictionaries, a simple press of the Escape key exits you to the previous menu where you can recover. If wrong words are added to the custom dictionary by accident, they can be deleted. Common disk and file location errors and their remedies are well documented in the manual.

Once installed in your AppleWorks program, QuickSpell 3.0 is very easy to use ( see Figure 3). The menu choices are simple and concise. Once you start the spelling checker, you are given three alternatives at the bottom of the screen — document, screen, and word — indicating the portion of the document to be checked.

Clear and concise instructions for every aspect of the program are given in the short manual provided with the program. The manual contains actual screen examples of every menu with explanations of all choices. A complete tutorial is provided covering configuring dictionary locations and actually using QuickSpell. The Reference section covers each menu choice in detail. Finally, a Utilities section explains the utilities and suggests uses for any extra RAM available in your particular hardware configuration.

TimeOut QuickSpell 3.0 is not really necessary if you already have AppleWorks 3.0. But the program is also compatible with AppleWorks 2.1, so if you have the older version, upgrading to QuickSpell 3.0 does provide an improved spelling checker for AppleWorks 2.0.

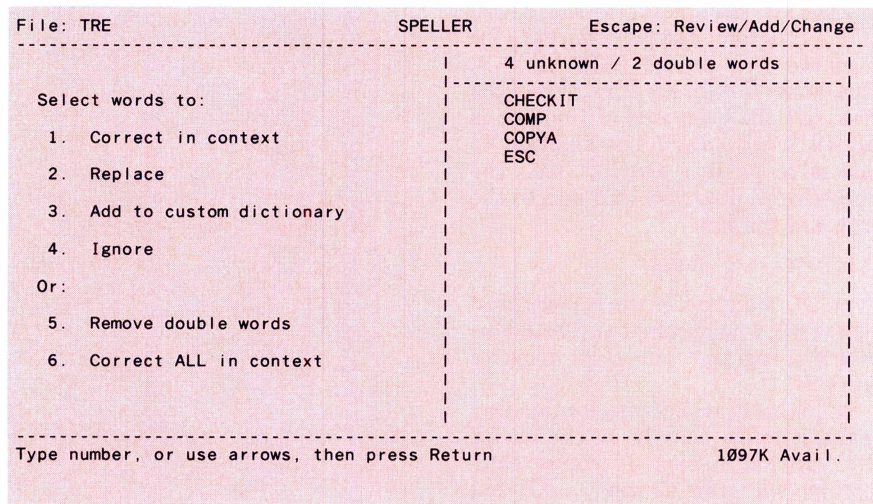


Figure 3: Timeout Quickspell

## WORDBENCH

Wordbench, "the tool for people who write," is a relatively new program. Tailored primarily for academic use, it is different from other currently available word processing programs because of the linking capabilities between its Outliner, Reference Tool, and Writer modules.

Wordbench offers an Analysis mode that does more than just check the spelling of words, but it is not a full grammar checker. The several methods for analyzing text in Wordbench include checking the spelling of individual words (see Figure 4); counting the characters, words, and headings; marking words that match those in a personal word list; and collapsing the document to display only certain portions of text. I will discuss only the spelling and word-matching components here.

Wordbench uses a proprietary dictionary developed especially for computer applications by Oasis Systems. Depending on the amount of memory available, separate dictionaries can be merged to create a more comprehensive word list. The word-matching capability compares words in your documents to custom text-based word lists that you create. These word lists can be created in any word processor capable of saving ASCII (text) files or in Wordbench itself and converted to an ASCII file.

Wordbench uses a special dictionary developed by scanning thousands of documents and searching for the most commonly used words. It is not as large as some of the more popular dictionary models, but it contains more of the common words, thereby decreasing dictionary search time. The user interface may seem a little awkward at first, since it is not one that most of us are familiar with. However, I got used to it quickly.

Since nearly all the functions in Wordbench are "hot-keyed" (one keypress and no need to press Return), it is very difficult to make operational errors in this program. When you move to a different module within Wordbench, your file is automatically saved, a sometimes distracting but very handy procedure that prevents inadvertent loss of data.

No real bugs popped up during the evaluation of this product. One quirk of the spelling checker is that it does not recognize punctuation as a part of a word. Because of this, when you use Wordbench the first few times, it initially marks every contraction in your document as a potentially misspelled word. If you know that each of these words is correct, however, you can "Add to Dictionary" whatever portion of the word it identifies. The next time the word occurs it will not be identified as incorrect. Not many documents are required before you have sufficient words added to your dictionary to overcome this little quirk.

Once you become familiar with the hot-key menu selections, navigating Wordbench becomes almost second

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*Wordbench's  
set of manuals  
is among the  
best I've seen  
in years.*

---

nature. Entering the Analyze function, for instance, is as easy as either pressing "A" or using the Arrow keys to highlight the "Analyze" function while in the Writer module. You then select a method of text analysis from the list of choices presented, and Wordbench does the rest. The only preliminary setup required in this program is entering the Folder Manager function and defining where the different required folders are located within your storage device system. This is a very easy program to use.

Wordbench comes with excellent documentation. Three separate well-bound manuals are included in the package: a full tutorial, a user's guide, and a reference manual. The package also includes a plastic laminated quick reference card containing blank spaces to write in your own "shortcuts" (macros) for even further increasing the functionality of the program. This

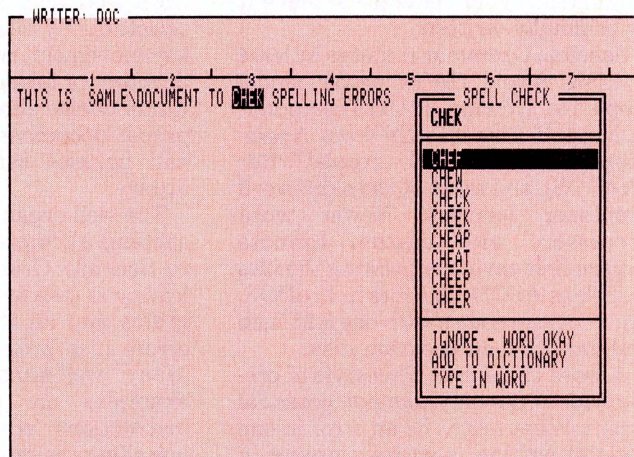


Figure 4: Wordbench

INSERT

set of reference manuals is among the best I've seen in the past few years.

Wordbench, although tailored primarily for academic use, is a fully functional word processor. Its one shortcoming is its difficulty recognizing contractions. This design consideration is understandable, however, since Wordbench is designed for more formal writing where contractions are usually not desirable. After processing a few documents and adding the contraction word parts to the dictionary, this problem disappears. The special "high frequency use" dictionary increases the efficiency of the search.

## SENSIBLE GRAMMAR

Sensible Grammar is a fast and easy to use stand-alone electronic proofreader that checks your word processing files for common writing errors. It compares your writing against a library of over 2,000 phrases to identify pompous, informal, cliché, vague, wordy, repetitive, racist, sexist and other "faulty" phrases. It also checks for correct punctuation.

Sensible Grammar checks your document files after they have been saved from your word processor. This allows it to preserve formatting information for files created in those programs with which it is directly compatible. When Sensible Grammar finds a potential problem phrase in your document, it displays the entire sentence containing the problem and explains what is wrong with it (see Figure 5). You can then use any of the editing tools to correct the sentence. When the search algorithm encounters an error, it automatically suggests alternate wordings that may be more proper. A keystroke shows you each suggested alternative wording as it would appear in your sentence. You can then either insert the suggested

version into your sentence or leave it as originally written.

Sensible Grammar requires at least a 128K Apple IIe or newer model Apple IIc, IIc Plus, or IIGS computer. It imports files directly from AppleWorks 2.1 and 3.0, AppleWriter (ProDOS), and most of the older word processor formats. Newer word processors with custom formats require first saving or printing the files to disk as ASCII text files in ProDOS. The program comes with one 5.25-inch and one 3.5-inch program disk.

A word of caution: This style of program identifies only common potential errors. What might be an error in one style of writing is entirely proper in another. While grammar is a set of rules, style is knowing how to use and break those rules; this program is no substitute for knowing proper English grammar or having additional style references nearby to resolve questionable syntax or grammatical construction. Sensible Grammar is best at catching common misuse of phrases. As the author, you remain the final judge of what is proper. Many times your original wording will be correct for the thoughts you are expressing in that particular context.

Escape and Cancel options are available at nearly every decision point in this program. If you have entered an incorrect phrase, simply select Escape or Cancel and your entry will be ignored. I couldn't crash the program no matter what I entered. There was always an adequate escape method.

Sensible Grammar is very easy to

learn and use. Simple menu items, selectable by either mouse or Arrow key movement, require no typing in of directory or folder paths. A Quick Configure choice allows you to select the proper document format very easily, and phrases can be added to the library.

The well-organized 68-page manual contains a comprehensive "15 Minutes to Sensible Grammar" tutorial that leads you step by step through all programs and all the possible types of errors it is programmed to identify. Many well-annotated screen shot examples are provided. Detailed instructions are also provided for installing the program on a hard disk. A special "warning" page is provided to ensure that you have the program properly configured for your particular word processor before using it to proofread any of your files. Software replacement policies and customer support information are provided in the front of the manual.

Sensible Grammar is the only currently available grammar checker that works on most Apple II configurations. Its stand-alone capability is especially desirable if you receive or produce documents from different word processor formats. It will not recognize single-word spelling errors, so you need a full-featured spelling checker for initial proofreading. Sensible Grammar will not catch all errors. It identifies commonly misused phrases and punctuation. The user is still responsible for recognizing and correcting individual phrase errors.

## CONCLUSION

Spelling and grammar checkers are not infallible; you still must rely on human intelligence to tell the difference between "too," "two," and "to," between "its" and "it's", and other common traps. But they can serve as a second pair of eyes that can find mistakes you might miss, giving your documents one more chance at improvement.

LEGEND:	★★★★★	= Excellent
	★★★★☆	= Very Good
	★★★☆☆	= Good
	★★☆☆☆	= Fair
	★☆☆☆☆	= Poor

### Nibble Review Card

#### The Sensible Speller

Sensible Software, Inc.  
335 E. Big Beaver, Suite 207  
Troy, MI 48083  
(313) 528-1950  
List Price: \$125

CATEGORY	RATING
Performance	★★★★☆
Error Handling	★★★★☆
Ease of Use	★★★★☆
Documentation	★★★★★
Overall Rating	★★★★☆

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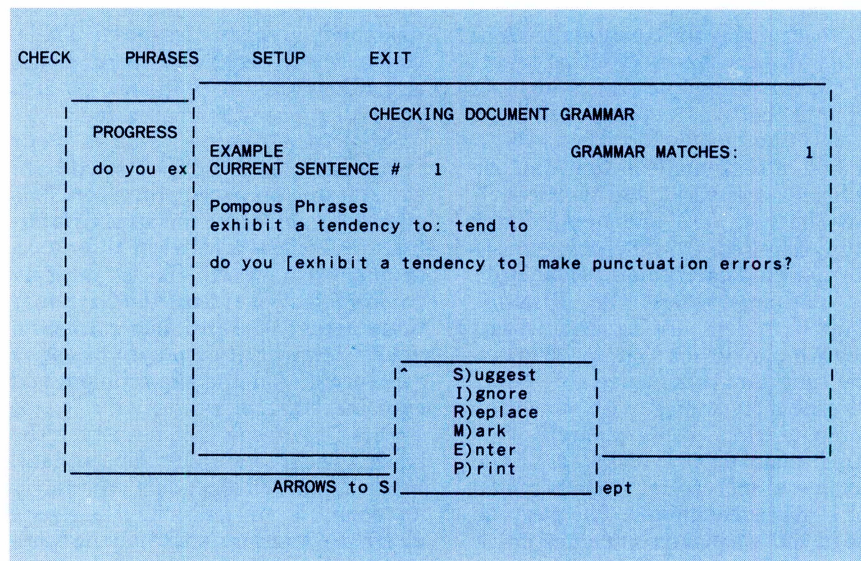


Figure 5: Sensible Grammar

### Nibble Review Card

#### AppleWorks 3.0

Claris Corporation  
440 Clyde Avenue  
Mountain View, CA 94043  
(408) 987-7000 (new)  
List Price: \$249

CATEGORY	RATING
Performance	★★★★★
Error Handling	★★★★☆
Ease of Use	★★★★★
Documentation	★★★★★
Overall Rating	★★★★★

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### Nibble Review Card

#### Timeout: Quickspell

Beagle Bros, Inc.  
6215 Ferris Square, Suite 100  
San Diego, CA 92121  
(619) 452-5500  
List Price: \$69.95

CATEGORY	RATING
Performance	★ ★ ★ ★ ☆
Error Handling	★ ★ ★ ☆ ☆
Ease of Use	★ ★ ★ ★ ☆
Documentation	★ ★ ★ ★ ☆

Overall Rating ★ ★ ★ ★ ☆

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### Nibble Review Card

#### Wordbench

Addison-Wesley Publishing Co., Inc.  
Consumer Software  
Route 28  
Reading, MA 01867  
(617) 944-3700  
List Price: \$149

CATEGORY	RATING
Performance	★ ★ ★ ★ ★
Error Handling	★ ★ ★ ★ ☆
Ease of Use	★ ★ ★ ★ ★
Documentation	★ ★ ★ ★ ★

Overall Rating ★ ★ ★ ★ ★

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### Nibble Review Card

#### Sensible Grammar

Sensible Software, Inc.  
335 E. Big Beaver, Suite 207  
Troy, MI 48083  
(313) 528-1950  
List Price: \$99.95

CATEGORY	RATING
Performance	★ ★ ★ ★ ☆
Error Handling	★ ★ ★ ★ ★
Ease of Use	★ ★ ★ ★ ☆
Documentation	★ ★ ★ ★ ★

Overall Rating ★ ★ ★ ★ ☆

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# Volume 4



# The Apple According to Mossberg

## Disassembly Lines

Sandy Mossberg has been exploring, dissecting and demonstrating the machine language that lies beneath Applesoft, DOS and ProDOS in the pages of *Nibble* for over five years. His Disassembly Lines column has entertained and educated thousands of fascinated readers. His work is available in these special book and disk packages. Each volume comes with a disk containing all disassemblies and demonstration programs. ProDOS disassemblies are in Big Mac/Merlin Assembler format.

**Disassembly Lines Volume 1** is a collection of the first eight installments of Sandy's column. You'll learn how to use Applesoft machine language in your own programs; how to build an Applesoft Line Editor; how Applesoft handles hex/dec data conversion, program listing and keyboard buffers; and how to make full use of the extended memory of your 64K Apple.

**Disassembly Lines Volume 2** delves deeply into DOS 3.3. It explores the base conversion routines, keyboard and video intercepts, and command parsing and processing. An in-depth discussion of the DOS 3.3 File Manager spotlights each DOS 3.3 command in detail. The disk includes an **unpublished bonus**: source files (in Big Mac/Merlin format) for each of the major tables in Applesoft and DOS 3.3!

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**Disassembly Lines Volume 4** explores the second half of the BASIC interpreter, with the focus on commands. Sandy dissects the ProDOS command handlers and the Applesoft BASIC file commands, showing you exactly how commands like CAT and BRUN work. He fixes a bug in BSAVE, and explains the code that ProDOS uses to create a RAM disk.

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# SWITCHED ON GRAPHICS

## The hard facts about soft switches

**S**ound, color, and motion. My English teacher always repeated these words when she discussed vivid, effective writing. Computer programming is much the same; these three elements can bring a dull Applesoft program to life. This series discusses placing graphics and animation in a program to create effective presentations. In this first article, we review high-resolution graphics and the Apple display soft-switches. Later, we will discuss special drawing techniques, shape tables, and animation secrets that the pros use. We will conclude the series with a brief focus on integrating sound into your programs.

Apple computers have a wide array of display modes. The text screen, 40 or 80 columns wide by 24 rows tall, is especially suitable for showing words and numbers. However, the old maxim "A picture is worth a thousand words" applies especially well to computers. A graph of an equation or an illustration makes obvious what a detailed description cannot. Low-resolution graphics, providing a display window 40 columns by 40 rows, is useful for some games, such as Pong. High-resolution graphics, with 280 columns by 192 rows, is even more useful. This high-resolution mode will be the focus of this series. Newer Apples support a plethora of other modes, including double low-resolution, double high-resolution, and super high-resolution. These modes, however, are more difficult to access from Applesoft.

High-resolution graphics gets its name because, in the original Apple II computer, this mode had the greatest resolution, i.e. the most dots per inch. For the rest of this article, I may refer to this mode as high-resolution or simply Hi-Res. Also, I will assume that you are fluent in Applesoft BASIC and know about the PEEK and POKE commands. In later articles, some hexadecimal numbers and a bit of machine language will be used, but don't worry if you do not know the arcane art. Since the graphics commands are of paramount importance, we will introduce them at this point.

### APPLESOFT BASIC GRAPHICS COMMANDS

Applesoft provides four built-in commands for manipulating the high-resolution graphics screen. They are: HGR, HGR2, HCOLOR=, and HPLOT. They can be used from the Applesoft prompt or within a program. Each is detailed below.

**HGR:** The Apple can display either of two high-resolution screens in its memory. These

Table 1: Standard Monitor Colors

Standard Monitor	
0) black	4) black
1) green	5) depends on TV
2) blue	6) depends on TV
3) white	7) white

Table 2: IIGS RGB Colors

Apple IIGS RGB Monitor	
0) black	4) black
1) green	5) orange
2) magenta	6) blue
3) white	7) white

*David Harris, 1112 Evelyn Court, Ridgecrest, CA 93555.  
This program is compatible with all Apple IIs.*

are called page 1 and page 2. The HGR command displays the first page and clears it to black. The screen is 280 pixels wide (0-279) and 160 pixels tall (0-159). A text window four lines tall is left at the bottom of the screen. An example of this command is

```
10 HGR
```

**HGR2:** This command is similar to HGR, but acts upon page 2. A field 280 pixels wide by 192 pixels tall (0-191) is displayed, but no text window is visible. In a BASIC program, you might use

```
20 HGR2
```

**HCOLOR=:** This command is used to set the color for HPGLOT commands. The command must be followed by the color number, between 0 and 7, inclusive. This number determines the color as shown in Tables 1 and 2. An example is

```
30 HCOLOR = 3
```

Table 1 lists the color Apple claims in the *BASIC Programming Reference Manual*, while Table 2 lists the actual colors displayed on an Apple IIGS RGB Monitor. Notice the effect of different monitors on the colors. Of course, monochrome monitors cannot display color, but they display a different pattern of dots for each color. In addition, when lines of different colors are close to each other, they seem to mix and cause strange effects. The reason for this phenomenon is based on Steve Wozniak's ingenious method of displaying color, and will be explained in depth later.

**HPLOT:** This command draws dots and lines on the screen in the current HCOLOR. If you simply enter HPLOT X,Y, the computer will draw a single dot on the screen at the location X,Y. If you enter HPLOT TO X,Y the computer will draw a line from the last dot plotted to the point X,Y. If you enter HPLOT X1,Y1 TO X2,Y2 TO X3,Y3 TO X4,Y4... the computer will make a "dot to dot" drawing, starting at X1,Y1, and drawing a line to each successive points. This example plots a diagonal line and a triangle:

```
40 HPLOT 0,0
50 HPLOT TO 70,90
60 HPLOT 43,50 TO 95,100 TO 107,60 TO 43,50
```

In all cases, X must be between 0 and 279 inclusive, and Y must be between 0 and 191. If the split-screen mode is active (i.e. four lines of text are displayed, such as in HGR), Y positions greater than 159 are not visible. (They are hidden behind the text.)

Note in Figure 1 that, unlike traditional graphs, the origin (0,0) is in the upper left corner.

## GRAPHICS PAGES

The concept of graphics pages (already mentioned under HGR and HGR2) is important for programming the Apple. Within the computer's memory, four different areas are reserved for display of text and graphics. They are referred to as pages. Text page 1 is used for 40- and 80-column text, as well as low-resolution graphics. Text page 2 is almost never used. In fact, Applesoft stores program code there; text page 2 can be displayed only by activating certain soft-switches. For all practical purposes, we can ignore this page. Hi-Res page 1 is the one shown by HGR. Hi-Res page 2 appears identical, and is displayed by HGR2. In addition, some programmers talk about a Hi-Res page 3. Located just above the second Hi-Res page in memory, it cannot be displayed on the screen directly. However, it

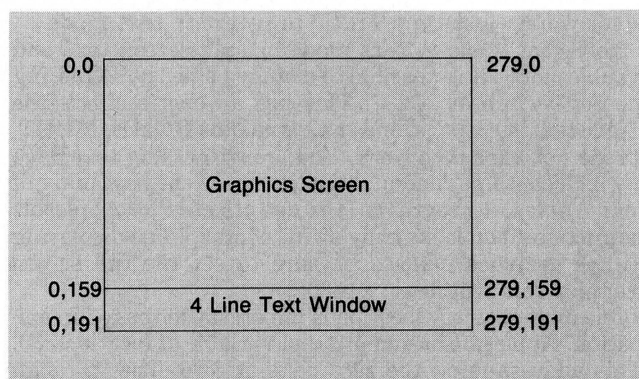


Figure 1: Hi-Res Page 1

occasionally has use in animation and special effects.

Using the different Hi-Res pages, you can create flicker-free animation. The key is to draw an image on page one and display it. Then draw a slightly different image on page two and flip to display the second page. Redraw another slightly different picture on the first page, flip back to it, and so on. This technique is much like a cartoon drawn on many sheets of paper that are rapidly flipped. Each page is drawn while the user is watching the previous page.

## SOFT-SWITCHES

How do we draw on different pages? The commands HGR and HGR2 cannot do this because they erase the page they display. Instead, we must turn to special memory locations in the Apple called soft-switches. These soft-switches determine what is displayed at the moment. The eight display switches common to all Apple IIs are listed below:

Address	Purpose
49232 (-16304)	Show Graphics Screen
49233 (-16303)	Show Text Screen
49234 (-16302)	Show Full Screen (if in Graphics)
49235 (-16301)	Show Split-Screen (if in Graphics)
49236 (-16300)	Show Text Page 1 or Graphics Page 1
49237 (-16299)	Show Text Page 2 or Graphics Page 2
49238 (-16298)	Show Lo-Res (if in Graphics)
49239 (-16297)	Show Hi-Res (if in Graphics)

The soft-switches are activated by POKEing their address with any number. For instance, to show the text screen, enter:

```
POKE 49233,0
```

or

```
POKE -16303,0
```

The two numbers 49233 and -16303 are considered equal by the computer. Also, you could have POKEd any number other than zero with the same effect; all that matters is the reference to the soft-switch.

Let's learn about these soft-switches by writing a brief program that displays Hi-Res page 1, but does not erase it the way HGR would.

```
10 POKE -16300,0 : REM SET PAGE NUMBER TO 1
20 POKE -16301,0 : REM ENABLE SPLIT SCREEN
30 POKE -16297,0 : REM ENABLE HI-RESOLUTION
40 POKE -16304,0 : REM FLIP FROM TEXT TO GRAPHICS
```

The order of setting the switches does not matter, but I usually like to conclude with -16304. This way, my program will instantly switch from text to graphics without any flicker. If you run this program before clearing the Hi-Res screen, the screen will be covered with random colors.

Don't worry; just type TEXT to revert to text mode.

Note that while in text mode or split-screen text and graphics mode it is possible to display page 2 by POKEing the soft-switch at 49237. This has an exotic effect: the visible text is garbage, and the commands HOME, PRINT, etc. do not appear to work. You are witnessing text page 2, which contains random data (probably the beginning of your Applesoft program). It is not affected by Applesoft instructions, and looks truly awful. Moral: When displaying Hi-Res graphics page 2, be sure to set the full screen graphics soft-switch at -16302.

One more memory location is important for page-flip animation. Applesoft has an internal variable at location 230. (This address is on the zero page at \$E6. The "\$" sign preceding a number indicates that the number is in base sixteen, or hexadecimal. Zero page addresses are those between 0 and 255. Applesoft uses many of them for storing its internal information.) This variable at \$E6 determines the Hi-Res page upon which HPLLOT will act. HGR and HGR2 automatically take care of setting the variable, but when you wish to draw on a different page while using the soft-switches, you must handle this variable yourself. In order to draw on Hi-Res page 1, enter POKE 230,32. Use POKE 230,64 for page 2. This switch also allows drawing to the invisible page 3 by writing POKE 230,96.

## EXAMPLE PROGRAM

In summary, we have reviewed Applesoft's built-in

drawing commands. We have learned about the different graphics pages and how to access them. And we have learned about using soft-switches to control the display directly.

Now we are ready to incorporate all of this knowledge into an simple animation program. Enter the program in Listing 1 and save it to disk with the command

SAVE HPLLOT.DEMO1

This program draws a ball, and, using page flipping for flicker-free animation, shows it bouncing across the screen. Lines 110-130 clear the screen and draw in the ground. Lines 140-160 read in the data for the ball's shape and initialize several variables.

The heart of the program is the animation routine, lines 210-310. The current drawing screen is set in line 310, so that the ball will be drawn on the screen not currently seen. Then the old ball is erased and a new ball is drawn. When it is completely drawn, the program flips to the new graphics page and reveals the ball in its new position. This process repeats on alternate screens, moving the ball just slightly each time, creating the illusion of motion.

The motion is flicker-free, but rather slow because of the number of lines that must be drawn. In a future article, we will learn how to use block shapes to create animation that is far, far faster.

## LISTING 1: HPLLOT.DEMO1

```

37 10 REM *****
C0 20 REM * HPLLOT.DEMO1 *
B9 30 REM * BY DAVID HARRIS *
AE 40 REM * COPYRIGHT(C) 1990 *
CB 50 REM * MINDCRAFT PUBL. CORP. *
24 60 REM * CONCORD, MA 01742 *
45 70 REM *****
D3 80 :
4A 90 : REM ** INITIALIZE **
F2 100 PRINT CHR$(21)
A7 110 HCOLOR=3
C4 120 HGR : HPLLOT 0,176 TO 279,176
6E 130 HGR2 : HPLLOT 0,176 TO 279,176
97 140 FOR LOOP = 0 TO 5: READ WIDTH(LOOP): NEXT
    LOOP
A9 150 X = 50:Y = 50
76 160 SCREEN = 0
AB 170 X1 = 10:Y1 = 10: REM NULL VALUES
9A 180 :
5B 190 : REM ** ANIMATE **
9F 200 :
40 210 FOR T = 1 TO 104
BC 220 POKE 230,32 * (SCREEN + 1)
80 230 X2 = X:Y2 = Y
C2 240 X = X1:Y = Y1: HCOLOR= 0: GOSUB 330
83 250 X1 = X2:Y1 = Y2
04 260 READ Y:Y = 170 - Y:X = T * 2 + 5
61 270 HCOLOR= 3: GOSUB 330
35 280 POKE - 16300 + SCREEN,0
79 290 SCREEN = 1 - SCREEN

```

```

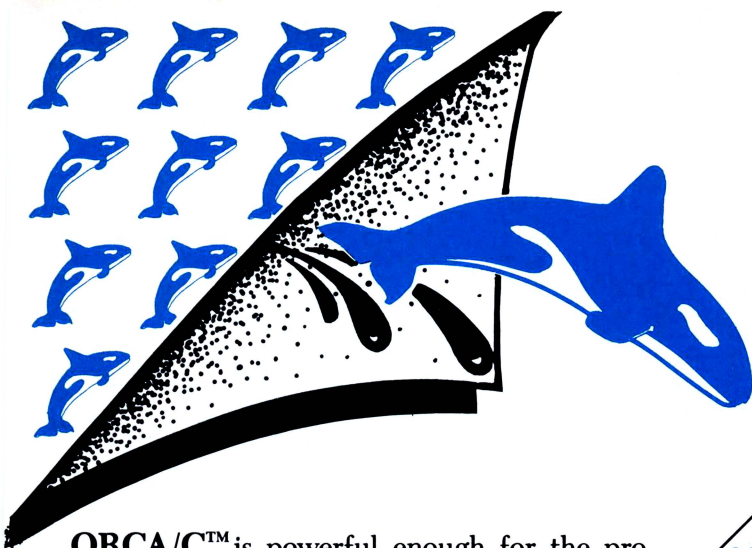
B5 300 NEXT T
6E 310 WAIT - 16384,128: TEXT : HOME : END
01 320 :
9F 330 : REM ** DRAW BALL **
9F 340 :
20 350 FOR LOOP = 0 TO 5
07 360 HPLLOT X - WIDTH(LOOP),Y - 5 + LOOP TO X +
    WIDTH(LOOP),Y - 5 + LOOP
BD 370 HPLLOT X - WIDTH(LOOP),Y + 5 - LOOP TO X +
    WIDTH(LOOP),Y + 5 - LOOP
0C 380 HPLLOT X,Y
FE 390 NEXT LOOP
BB 400 RETURN
15 410 DATA 1,3,4,4,5,5
05 420 :
12 430 : REM ** PATH DATA **
A7 440 :
F2 450 DATA 150,147,145,142,140,135,130,125,120,
    112,105,97,90,80,70,60,50,37,25,12,0
82 460 DATA 10,20,30,40,47,55,62,70,75,80,85,90,
    92,95,97,100,97,95,92,90,85,80,75,70,62,55,
    47,40,30,20,10,0
0A 470 DATA 7,15,22,30,35,40,45,50,52,55,57,60,5
    7,55,52,50,45,40,35,30,22,15,7,0
22 480 DATA 5,10,15,20,22,25,27,30,27,25,22,20,1
    5,10,5,0
3C 490 DATA 2,5,7,10,7,5,2,0
21 500 DATA 0,0,0

```

TOTAL: E91F

END OF LISTING 1





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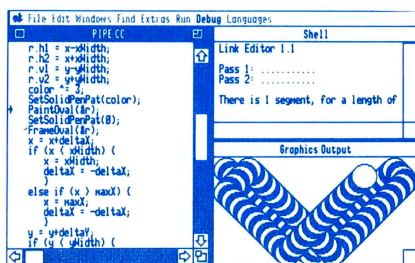
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# SMART COLOR FILL

**S**mart Color Fill is a short machine-language program that will fill almost any black area with the colors designated by the Applesoft HCOLOR command (1, 2, 3, 5, 6, or 7).

Last spring, I needed a fill routine to accompany a graphics program on which I was working. The routine had to fill complex areas, meaning I couldn't just use one of the commercial fill routines available. (The majority of these are geared for speed, and the ability to fill complex areas would slow them down unacceptably.)

So, I had to write my own fill routine. The first thing I needed was an algorithm for complete filling. Computer graphics journals have published numerous articles about filling algorithms, so I checked through the ones at a university library. No luck. Most of the algorithms were described in a very hazy pseudocode, or were written in a computer language that hasn't been used in 15 years or so. The rest of the algorithms were impractical for anything less than a mainframe. So I had to come up with my own algorithm.

---

*Brent Iverson, Select Software, 9538 Pondwood Road, Boca Raton, FL 33433. This program is compatible with DOS 3.3 and ProDOS.*

Hang  
new  
shades  
on  
any  
shape



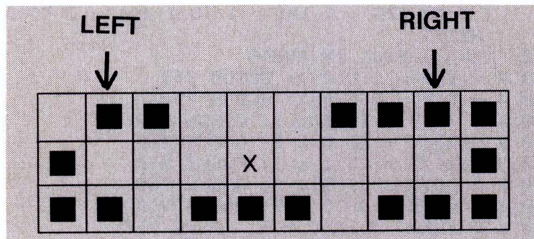


Figure 1: X marks the starting point

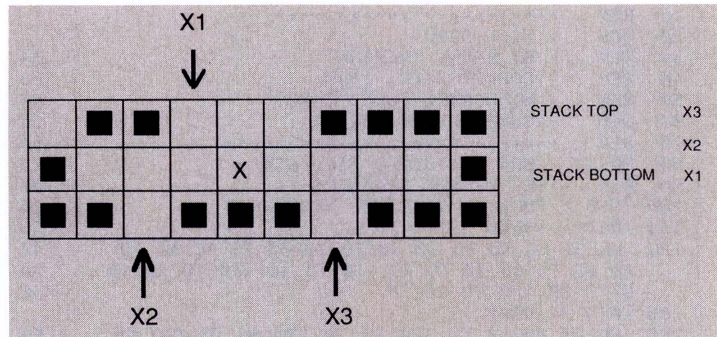


Figure 2: The stack

## USING THE PROGRAM

To use FILL.DEMO (Listing 1), just run the program and watch the Hi-Res screen. It will plot a few patterns on the screen, make calls to the filling routine, make a short buzzing sound, and end. The filling part of the program takes 20 seconds.

FILL.BIN will fill a black area enclosed by most non-black boundaries. The fill color must be between 1 and 7. To use this routine from Applesoft, you must first initialize certain memory locations in the following manner:

```
POKE 6,X-(X-255)*256
POKE 7,X-255
POKE 8,Y
POKE 9,C
```

X and Y represent the screen coordinates at which the filling will start, and C is the fill color (1-7). Once you've done this, call the routine with

```
CALL 16384
```

## ENTERING THE PROGRAM

To enter the routine, you can type the source code from Listing 2 into the Editor Assembler (if you have it), and save the object code as FILL.BIN. Or you can type in the hex codes from Listing 3. First enter the Monitor with

```
CALL -151
```

Save the file with the command

```
BSAVE FILL.BIN,A$4000,L$30D
```

To enter the demonstration program, type in Listing 1 and save it with

```
SAVE FILL.DEMO
```

For more help with *Nibble* listings, see the Typing Tips section in this issue.

## HOW THE PROGRAM WORKS

FILL.BIN uses an algorithm that works this way:

1. It searches to the left from the starting point until it reaches a colored dot. It stores the position of the dot to the right of this one as *Left*. Then, it searches to the right from the starting point until it finds a colored dot. It stores the position of the dot to the left of this one as *Right*. (See Figure 1. The X is the starting point of the fill. The dots are colored pixels. The other pixels are black, or uncolored.)
2. From left to right, it searches one row above the starting point for the dots in uncolored spaces that are farthest

to the left. In this case, the only one is at X1. It pushes this position onto the stack.

3. It searches from left to right, one row below the starting point, for dots as described in step two. In this case, it will find X2 and X3, and it pushes them onto the stack. Figure 2 shows the state of the stack, as well as the points we've found so far, after step three has been carried out.
4. The algorithm picks a new starting point from the top of the stack (in this case, X3), and starts over at step one.

Because of the way color is obtained on the Apple, this program will not fill areas of two dots or less, and frequently will miss areas of three dots. If the program were able to fill in these areas, it would also fill between the alternately spaced dots of nonwhite lines.

This program is not as fast as the filling routines used in Hi-Res adventures, because those don't have to check above and below every dot in a row, as this program does. Filling the entire screen takes about 17 seconds.

---

*The routine will fill any area with any Hi-Res color unless the area is exceedingly complex.*

---

## MODIFICATIONS

FILL.BIN will fill any area unless the area is exceedingly complex (and the program runs out of stack space). If this happens, the program will end with the area only partially filled. If you want to increase the stack space available to the program (to allow it to fill very complex areas), just increase the value of LIM in the source listing.

The program is assembled just above the first Hi-Res page. If you want to assemble it at a different location, just remember to change the address of STBASE (the location of the first byte of storage for the stack used by the program).

The stack uses (3 \* LIM) bytes, starting at STBASE.

# LISTING 1: FILL.DEMO

```

37 10 REM *****
C0 20 REM * FILL.DEMO *
B9 30 REM * BY BRENT IVERSON *
AE 40 REM * COPYRIGHT(C) 1990 *
CB 50 REM * MINDCRAFT PUBL. CORP. *
24 60 REM * CONCORD, MA. 01742 *
45 70 REM *****
61 80 PRINT CHR$(4)"BLOAD FILL.BIN"
41 90 REM ---SET UP FOR GRAPHICS
56 100 HGR : POKE - 16302,0: HCOLOR= 3
D7 110 REM ---DRAW "F"
09 120 HPLLOT 30,30 TO 70,30 TO 70,50 TO 40,50 TO
    40,90 TO 60,90 TO 60,110 TO 40,110 TO 40,15
    0 TO 30,150 TO 30,30
25 130 REM ---DRAW "I"
88 140 HPLLOT 80,30 TO 130,30 TO 130,50 TO 110,50
    TO 110,130 TO 130,130 TO 130,150 TO 80,150
    TO 80,130 TO 100,130 TO 100,50 TO 80,50 TO
    80,30
F3 150 REM ---DRAW "L"
67 160 HPLLOT 150,30 TO 160,30 TO 160,130 TO 190,1
    30 TO 190,150 TO 150,150 TO 150,30
29 170 REM ---DRAW "L"
0F 180 HPLLOT 210,30 TO 220,30 TO 220,130 TO 250,1
    30 TO 250,150 TO 210,150 TO 210,30
1D 190 REM ---MAKE BORDER LINES

```

```

F9 200 FOR I = 0 TO 24 STEP 6: HPLLOT I,I TO 279 -
    I,I TO 279 - I,191 - I TO I,191 - I TO I,I
    : NEXT
A4 210 REM ---FILL IN AREAS
F3 220 X = 2:Y = 2:C = 1: GOSUB 350
5C 230 X = 8:Y = 8:C = 2: GOSUB 350
9B 240 X = 14:Y = 14:C = 1: GOSUB 350
61 250 X = 20:Y = 20:C = 2: GOSUB 350
14 260 X = 26:Y = 26:C = 3: GOSUB 350
DE 270 X = 35:Y = 35:C = 5: GOSUB 350
96 280 X = 85:Y = 35:C = 6: GOSUB 350
E5 290 X = 155:Y = 35:C = 5: GOSUB 350
44 300 X = 215:Y = 35:C = 6: GOSUB 350
AA 310 REM ---MAKE BUZZ AND END
DE 320 FOR I = 1 TO 100:P = PEEK ( - 16336): NEX
    T
EE 330 END
55 340 REM ---CALL FILL ROUTINE
0A 350 POKE 6,X - (X > 255) * 256
0A 360 POKE 7,X > 255
2B 370 POKE 8,Y
47 380 POKE 9,C
B2 390 CALL 16384
BB 400 RETURN

```

TOTAL: 3BFA

END OF LISTING 1

# LISTING 2: FILL.BIN Source Code

```

1 .....
2 * FILL.BIN SOURCE CODE *
3 * BY BRENT IVERSON *
4 * COPYRIGHT(C) 1990 *
5 * MINDCRAFT PUBL. CORP. *
6 * CONCORD, MA 01742 *
7 * EDITOR ASSEMBLER *
8 .....
9 *
10 ORG 16384
11 JMP BEGIN
12 *
13 * ONE-BYTE VARIABLES
14 *
15 DEPTH DS 1
16 COLOR DS 1
17 XBYTE DS 1
18 OXBYTE DS 1
19 XBIT DS 1
20 OXBIT DS 1
21 YC DS 1
22 XLBIT DS 1
23 XLBYTE DS 1
24 XRBIT DS 1
25 XRBYTE DS 1
26 F DS 1
27 M0 DS 1
28 M1 DS 1
29 M2 DS 1
30 M3 DS 1
31 D0 DS 1
32 D1 DS 1
33 D2 DS 1
34 CODE DS 1
35 *
36 * LOCATIONS OF PARAMETERS
37 * GIVEN TO THIS ROUTINE
38 *
39 XL EQU 6
40 XH EQU 7
41 YB EQU 8
42 CO EQU 9
43 *
44 * BITMASKS USED TO
45 * DETECT OPEN AREAS
46 *
47 BITMASK DFB 1,2,4,8
48 DFB 16,32,64
49 FBITMASK DFB 3,7,14,28
50 DFB 56,112,96
51 *
52 * LOCATION OF LINE-BASE
53 * DATA FROM HBAS ROUTINE
54 *
55 ONE EQU $26
56 *
57 * MAXIMUM NUMBER OF
58 * BYTES IN EACH STACK
59 *
60 LIM EQU 100
61 *
62 * STACK LOCATIONS
63 *
64 STBASE EQU 18000
65 STACKXBYTE EQU STBASE
66 STACKXBIT EQU STBASE+LIM
67 STACKYC EQU STBASE+LIM+LIM
68 *
69 * APPLESOFT HI-RES ROUTINES
70 *

```

```

71 HPOSN EQU $F411
72 HLIN EQU $F53A
73 HPLLOT EQU $F457
74 HCOLOR EQU $F6F0
75 *
76 *-----
77 *
78 * INITIALIZE STACK
79 *
80 BEGIN LDA #0
81 STA DEPTH
82 *
83 * GET X-BIT,X-BYTE,
84 * AND Y-COORDINATE
85 *
86 JSR DIVIDE
87 LDA D2
88 STA XBIT
89 LDA D1
90 STA XBYTE
91 LDA YB
92 STA YC
93 *
94 * GET COLOR. CHECK
95 * THAT IT IS <8 AND
96 * NON-BLACK
97 *
98 LDX CO
99 BEQ RET
100 CFX #8
101 BCS RET
102 CFX #4
103 BNE COL
104 RET
105 *
106 * DESIRED COLOR IS
107 * LEGAL, SO CHANGE
108 * HCOLOR TO THAT
109 *
110 COL STX COLOR
111 JSR HCOLOR
112 *
113 * SAVE CURRENT XBIT
114 * AND XBYTE
115 *
116 MAIN LDA XBYTE
117 STA OXBYTE
118 LDA XBIT
119 STA OXBIT
120 *
121 * FIND LEFTMOST BYTE
122 * OF THIS ROW
123 *
124 LDX #0
125 LDY #0
126 LDA YC
127 JSR HPOSN
128 *
129 * CHECK IF THIS LOCATION
130 * IS COLORED. IF IT IS,
131 * THEN SKIP THE WHOLE
132 * CHECKING & COLORING ROUTINE
133 * AND GO GET THE NEXT
134 * LOCATIONS FROM THE STACK
135 *
136 LDY XBYTE
137 LDX XBIT
138 JSR VERIFY
139 BEQ LOOPLEFT

```

```

140 JMP END
141 *
142 * IF CURRENT LOCATION IS
143 * COLORED, STOP ADVANCING
144 * TO THE LEFT
145 *
146 STARTLEFT BNE GOTLEFT
147 *
148 * DECREMENT THE X-BIT. IF
149 * NECESSARY, DECREMENT THE
150 * X-BYTE.
151 *
152 LOOPLEFT DEC XBIT
153 LDA XBIT
154 CMP #255
155 BNE CONTLEFT
156 LDA #6
157 STA XBIT
158 DEC XBYTE
159 *
160 * IF WE HAVE GONE OFF
161 * THE LEFT SIDE OF THE
162 * SCREEN, JUMP OUT OF
163 * THIS LOOP
164 *
165 LDA XBYTE
166 CMP #255
167 BEQ GOTLEFT
168 *
169 * CHECK WHETHER THE CURRENT
170 * LOCATION IS COLORED
171 *
172 CONTLEFT LDY XBYTE
173 LDX XBIT
174 JSR VERIFY
175 JMP STARTLEFT
176 *
177 * WE HAVE FOUND THE FIRST
178 * COLORED LOCATION TO THE
179 * LEFT OF THE STARTING
180 * POINT, SO INCREMENT
181 * THIS LOCATION TO GET THE
182 * LEFTMOST UNCOLORED SPOT
183 *
184 GOTLEFT INC XBIT
185 LDA XBIT
186 CMP #7
187 BCC ENDFLEFT
188 INC XBYTE
189 LDA #0
190 STA XBIT
191 *
192 * SAVE THIS UNCOLORED
193 * SPOT
194 *
195 ENDFLEFT LDA XBIT
196 STA XLBIT
197 LDA XBYTE
198 STA XLBYTE
199 *
200 * START CHECKING TO THE
201 * RIGHT OF THE ORIGINAL
202 * STARTING POINT FOR THIS
203 * ROW
204 *
205 LDA OXBYTE
206 STA XBYTE
207 TAY
208 LDA OXBIT

```

```

209 STA XBIT
210 TAX
211 JSR VERIFY
212 *
213 * IF CURRENT LOCATION IS
214 * COLORED, STOP ADVANCING
215 * TO THE RIGHT
216 *
217 STARTRIGHT BNE GOTRIGHT
218 *
219 * INCREMENT THE X-BIT.
220 * IF NECESSARY, INCREMENT
221 * THE X-BYTE
222 *
223 LOOPRIGHT INC XBIT
224 LDA XBIT
225 CMP #7
226 BCC CONTRIGHT
227 LDA #0
228 STA XBIT
229 INC XBYTE
230 *
231 * IF WE HAVE GONE OFF
232 * THE RIGHT SIDE OF THE
233 * SCREEN, STOP ADVANCING
234 * TO THE RIGHT
235 *
236 LDA XBYTE
237 CMP #40
238 BEQ GOTRIGHT
239 *
240 * CHECK IF THE CURRENT
241 * LOCATION IS COLORED
242 *
243 CONTRIGHT LDY XBYTE
244 LDX XBIT
245 JSR VERIFY
246 JMP STARTRIGHT
247 *
248 * WE HAVE FOUND THE FIRST
249 * COLORED LOCATION TO THE
250 * RIGHT OF OUR STARTING
251 * POINT, SO DECREMENT THIS
252 * LOCATION TO FIND THE LAST
253 * UNCOLORED LOCATION TO THE
254 * RIGHT OF THE STARTING POINT.
255 *
256 GOTRIGHT DEC XBIT
257 LDA XBIT
258 CMP #255
259 BNE ENDRIGHT
260 LDA #6
261 STA XBIT
262 DEC XBYTE
263 *
264 * STORE THIS UNCOLORED
265 * SPOT
266 *
267 ENDRIGHT LDA XBIT
268 STA XRBIT
269 LDA XBYTE
270 STA XRYTE
271 *
272 * DRAW A LINE BETWEEN
273 * THESE TWO UNCOLORED
274 * LOCATIONS
275 *
276 JSR PLOT
277 *
278 * IF WE ARE AT THE TOP
279 * OF THE SCREEN, DON'T
280 * CHECK ABOVE THIS ROW
281 *
282 LDA YC
283 BEQ STARTB
284 *
285 * SET THE "COLORED"
286 * FLAG
287 *
288 LDA #0
289 STA F
290 *
291 * CHECK ABOVE THIS ROW,
292 * BETWEEN OUR TWO ENDPOINTS,
293 * FOR POSSIBLE LOCATIONS
294 * TO ADD TO THE STACK
295 *
296 LDA XLBIT
297 STA XBIT
298 LDA XLBYTE
299 STA XBYTE
300 *
301 * FIND THE LEFTMOST
302 * BYTE OF THE ROW ABOVE
303 * OUR STARTING ROW
304 *
305 LDX #0
306 LDY #0
307 LDA YC
308 SEC
309 SBC #1
310 JSR HPOSN
311 *
312 * CHECK IF LOCATION
313 * IS COLORED
314 *
315 LKABOVE LDY XBYTE
316 LDX XBIT
317 JSR FVERIFY
318 BNE ACOL
319 *
320 * LOCATION IS UNCOLORED.
321 * IF THE "COLORED" FLAG

```

```

322 * IS SET, CLEAR IT AND ADD
323 * THIS LOCATION TO THE STACK
324 *
325 LDA F
326 BNE INCA
327 DEC YC
328 JSR PUSH
329 INC YC
330 LDA #1
331 STA F
332 JMP INCA
333 *
334 * LOCATION IS COLORED.
335 * SET "COLORED" FLAG.
336 *
337 ACOL LDA #0
338 STA F
339 *
340 * INCREMENT THE XBIT.
341 * IF NECESSARY, INCREMENT
342 * THE XBYTE
343 *
344 INCA INC XBIT
345 LDA XBIT
346 CMP #7
347 BCC ENDA
348 LDA #0
349 STA XBIT
350 INC XBYTE
351 *
352 * IF WE HAVE GONE PAST
353 * THE RIGHT LIMIT, END
354 * THIS LOOP.
355 *
356 ENDA LDA XBYTE
357 CMP XRYTE
358 BCC LKABOVE
359 BNE STARTB
360 LDA XBIT
361 CMP XRBIT
362 BCC LKABOVE
363 BEQ LKABOVE
364 *
365 * SET THE "COLORED" FLAG
366 *
367 STARTB LDA #0
368 STA F
369 *
370 * IF WE ARE AT THE BOTTOM
371 * OF THE SCREEN, DON'T
372 * CHECK BELOW THIS ROW
373 *
374 LDA YC
375 CMP #191
376 BCS END
377 *
378 * CHECK THE ROW BELOW OUR
379 * STARTING ONE, BETWEEN THE
380 * TWO HORIZONTAL ENDPOINTS, FOR
381 * LOCATIONS TO ADD TO THE
382 * STACK.
383 *
384 LDA XLBIT
385 STA XBIT
386 LDA XLBYTE
387 STA XBYTE
388 *
389 * FIND THE LEFTMOST BYTE
390 * OF THIS ROW
391 *
392 LDX #0
393 LDY #0
394 LDA YC
395 CLC
396 ADC #1
397 JSR HPOSN
398 *
399 * CHECK IF THE CURRENT
400 * LOCATION IS COLORED
401 *
402 LKBELOW LDY XBYTE
403 LDX XBIT
404 JSR FVERIFY
405 BNE BCOL
406 *
407 * THE CURRENT LOCATION IS
408 * UNCOLORED. IF THE "COLORED"
409 * FLAG IS SET, CLEAR IT AND
410 * ADD THIS LOCATION TO THE
411 * STACK.
412 *
413 LDA F
414 BNE INCB
415 INC YC
416 JSR PUSH
417 DEC YC
418 LDA #1
419 STA F
420 JMP INCB
421 *
422 * THE CURRENT LOCATION IS
423 * COLORED, SO SET THE
424 * "COLORED" FLAG
425 *
426 BCOL LDA #0
427 STA F
428 *
429 * INCREMENT THE XBIT. IF
430 * NECESSARY, INCREMENT THE
431 * XBYTE.
432 *
433 INCB INC XBIT
434 LDA XBIT

```

```

435 CMP #7
436 BCC ENDB
437 LDA #0
438 STA XBIT
439 INC XBYTE
440 *
441 * IF WE ARE PAST OUR
442 * RIGHT HORIZONTAL LIMIT,
443 * END THIS LOOP
444 *
445 ENDB LDA XBYTE
446 CMP XRYTE
447 BCC LKBELOW
448 BNE END
449 LDA XBIT
450 CMP XRBIT
451 BCC LKBELOW
452 BEQ LKBELOW
453 *
454 * POP ANOTHER LOCATION
455 * FROM THE STACK AND
456 * START MAIN LOOP AGAIN
457 *
458 END JSR POP
459 JMP MAIN
460 *
461 *-----
462 *
463 * SUBROUTINE TO PUSH
464 * LOCATION DATA ONTO
465 * THE STACK.
466 *
467 * IF THE STACK IS ALREADY
468 * FULL, THEN RETURN WITHOUT
469 * PUSHING
470 *
471 PUSH LDA DEPTH
472 CMP #LIM
473 BCS PUSH2
474 *
475 * INCREMENT THE DEPTH
476 * COUNTER
477 *
478 INC DEPTH
479 *
480 * PUSH THE DATA ONTO
481 * THE APPROPRIATE STACK
482 *
483 LDX DEPTH
484 LDA XBYTE
485 STA STACKXBYTE,X
486 LDA XBIT
487 STA STACKXBIT,X
488 LDA YC
489 STA STACKYC,X
490 PUSH2 RTS
491 *
492 *-----
493 *
494 * SUBROUTINE TO POP
495 * LOCATION DATA FROM
496 * THE STACK
497 *
498 * IF THE STACK IS EMPTY,
499 * THEN TAKE THE LAST RETURN
500 * ADDRESS FROM THE STACK
501 * AND EXECUTE AN "RTS" TO
502 * RETURN TO WHATEVER CALLED
503 * THIS WHOLE PROGRAM
504 *
505 POP LDA DEPTH
506 BNE POP2
507 PLA
508 PLA
509 RTS
510 *
511 * POP THE LOCATION DATA
512 * FROM ITS APPROPRIATE STACK
513 *
514 POP2 LDX DEPTH
515 LDA STACKXBYTE,X
516 STA XBYTE
517 LDA STACKXBIT,X
518 STA XBIT
519 LDA STACKYC,X
520 STA YC
521 *
522 * DECREMENT THE DEPTH
523 * COUNTER
524 *
525 DEC DEPTH
526 RTS
527 *
528 *-----
529 *
530 * VERIFY ROUTINE USED
531 * WHEN CHECKING LEFT AND
532 * RIGHT FOR COLORED DOTS
533 * IN A ROW
534 *
535 * GET THE BYTE TO BE
536 * CHECKED AND STORE IT
537 *
538 VERIFY LDA (ONE),Y
539 STA CODE
540 *
541 * "AND" IT WITH THE
542 * PROPER BITMASK TO
543 * CHECK FOR THE BIT
544 * IN QUESTION
545 *
546 LDA BITMASK,X
547 AND CODE

```

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## LISTING 2: FILL.BIN Source Code

continued

```

548          RTS
549 .
550 .-----
551 .
552 . VERIFY ROUTINE USED
553 . WHEN CHECKING FOR LOCATIONS
554 . TO ADD TO THE STACK
555 .
556 . GET THE CURRENT BYTE
557 .
558 FVERIFY LDA (ONE),Y
559 STA CODE
560 .
561 . IF WE ARE CHECKING
562 . BITS 0 OR 6, DO SPECIAL
563 . ROUTINES FOR THESE
564 . CASES
565 .
566          CPX #6
567          BEQ FVERIFY6
568          CPX #0
569          BEQ FVERIFY0
570 .
571 . "NORMAL" CASE. CHECK
572 . THREE ADJACENT BITS IN
573 . THE CURRENT BYTE
574 .
575          LDA FBITMASK.X
576          AND CODE
577          RTS
578 .
579 . "SIXTH BIT" CASE.
580 . GET THE TWO RIGHTMOST
581 . VISIBLE BITS IN THE
582 . CURRENT BYTE
583 .
584 FVERIFY6 LDA FBITMASK.X
585          AND CODE
586          STA D0
587 .
588 . GET THE LEFTMOST BIT
589 . IN THE BYTE TO THE RIGHT
590 . OF THIS ONE
591 .
592          INY
593          LDA (ONE),Y
594          AND #1
595 .
596 . "OR" THE TWO RESULTS
597 . TOGETHER
598 .
599          ORA D0
600          RTS
601 .
602 . "ZERO TH BIT" CASE
603 . GET THE LEFTMOST TWO
604 . BITS IN THE CURRENT BYTE
605 .
606 FVERIFY0 LDA FBITMASK.X
607          AND CODE
608          STA D0
609 .
610 . GET THE RIGHTMOST VISIBLE
611 . BIT IN THE BYTE TO THE LEFT
612 . OF THIS ONE
613 .
614          DEY
615          LDA (ONE),Y
616          AND #64
617 .
618 . "OR" THESE TOGETHER FOR
619 . THE FINAL RESULT
620 .
621          ORA D0
622          RTS
623 .
624 .-----
625 .
626 . SUBROUTINE TO PLOT A
627 . LINE BETWEEN TWO POINTS
628 . SPECIFIED BY BITS AND
629 . BYTES, ON THE SAME ROW
630 .
631 . MULTIPLY THE LEFT BYTE
632 . BY 7 AND ADD THE LEFT
633 . BIT TO GET THE LEFT
634 . HORIZONTAL COORDINATE
635 .
636 PLOT LDA XLBYTE
637 STA M2
638 LDA #7
639 STA M3
640 JSR MULTIPLY
641 LDA M1
642 CLC
643 ADC XLBIT
644 TAX
645 BCC PLOT2
646 INC M0
647 PLOT2 LDY M0
648 LDA YC
649 .
650 . PLOT THE LEFT COORDINATE
651 .
652          JSR HPLOT
653 .
654 . MULTIPLY THE RIGHT BYTE
655 . BY 7 AND ADD THE RIGHT BIT
656 . TO GET THE RIGHT HORIZONTAL
657 . COORDINATE
658 .

```

```

659          LDA XRBYTE
660          STA M2
661          LDA #7
662          STA M3
663          JSR MULTIPLY
664          LDA M1
665          CLC
666          ADC XRBIT
667          BCC PLOT3
668          INC M0
669 PLOT3 LDX M0
670 LDY YC
671 .
672 . DRAW A LINE BETWEEN THE
673 . LEFT AND RIGHT COORDINATES
674 .
675          JSR HLIN
676          RTS
677 .
678 .-----
679 .
680 . SUBROUTINE TO MULTIPLY
681 . TWO 8-BIT NUMBERS TOGETHER
682 . WITH A 16-BIT RESULT
683 .
684 MULTIPLY LDA #0
685 STA M0
686 STA M1
687 LDX #8
688 MULT1 ASL A
689 ROL M0
690 ASL M3
691 BCC MULT2
692 CLC
693 ADC M2
694 BCC MULT2
695 INC M0
696 MULT2 DEX
697 BNE MULT1
698 STA M1
699 RTS
700 .
701 .-----
702 .
703 . SUBROUTINE TO DIVIDE
704 . A 16-BIT NUMBER BY 7.
705 . GIVING AN 8-BIT RESULT
706 . AND A REMAINDER
707 .
708 DIVIDE LDX #8
709 LDA #7
710 STA D0
711 LDA XL
712 STA D1
713 LDA XH
714 DIV ASL D1
715 ROL A
716 CMP D0
717 BCC DIV2
718 SBC D0
719 INC D1
720 DIV2 DEX
721 BNE DIV
722 STA D2
723 RTS

```

END OF LISTING 2

## LISTING 3: FILL.BIN

Start: 4000

Length: 30D

```

81 4000:4C 25 40 A0 A0 F5 D4 B0
2F 4008:F5 A0 E1 A0 B4 C4 A0 87
5F 4010:A0 A0 A0 B7 8A CC C5 01
40 4018:02 04 08 10 20 40 03 07
BC 4020:0E 1C 38 70 60 A9 00 8D
E2 4028:03 40 20 E9 42 AD 15 40
D2 4030:8D 07 40 AD 14 40 8D 05
31 4038:40 A5 08 8D 09 40 A6 09
73 4040:F0 08 E0 08 B0 04 E0 04
38 4048:D0 01 60 8E 04 40 20 F0
11 4050:F6 AD 05 40 8D 06 40 AD
A7 4058:07 40 8D 08 40 A2 00 A0
F8 4060:00 AD 09 40 20 11 F4 AC
C7 4068:05 40 AE 07 40 20 3A CE
FF 4070:F0 05 4C F3 41 D0 25 CE
8D 4078:07 40 AD 07 40 C9 FF D0
82 4080:0F A9 06 8D 07 40 CE 05
15 4088:40 AD 05 40 C9 FF F0 0C
6D 4090:AC 05 40 AE 07 40 20 3A
ED 4098:42 4C 75 40 EE 07 40 AD
29 40A0:07 40 C9 07 90 08 EE 05
C8 40A8:40 A9 00 8D 07 40 AD 07
2D 40B0:40 8D 0A 40 AD 05 40 8D
10 40B8:0B AD 06 40 8D 05 40
20 40C0:A8 AD 08 40 8D 07 40 AA
DC 40C8:20 3A 42 D0 25 EE 07 40

```

```

56 40D0:AD 07 40 C9 07 90 0F A9
8F 40D8:00 8D 07 40 EE 05 40 AD
8C 40E0:05 40 C9 28 F0 0C AC 05
09 40E8:40 AE 07 40 20 3A 42 4C
3A 40F0:C8 40 CE 07 40 AD 07 40
54 40F8:C9 FF D0 08 A9 06 8D 07
16 4100:40 CE 05 40 AD 07 40 8D
8F 4108:0C 40 AD 05 40 8D 0D 40
B0 4110:20 7E 42 AD 09 40 F0 6A
50 4118:A9 00 8D 0E 40 AD 0A 40
EC 4120:8D 07 40 AD 0B 40 8D 05
23 4128:40 A2 00 A0 00 AD 09 40
37 4130:38 E9 01 20 11 F4 AC 05
27 4138:40 AE 07 40 20 46 42 D0
28 4140:16 AD 0E 40 D0 16 CE 09
05 4148:40 20 F9 41 EE 09 40 A9
62 4150:01 8D 0E 40 5C 41 A9
09 4158:00 8D 0E 40 EE 07 40 AD
7D 4160:07 40 C9 07 90 08 A9 00
25 4168:8D 07 40 EE 05 40 AD 05
BC 4170:40 CD 0D 40 90 C0 D0 0A
9A 4178:AD 07 40 CD 0C 40 90 B6
CF 4180:F0 B4 A9 00 8D 0E 40 AD
FA 4188:09 40 C9 BF B0 65 AD 0A
F3 4190:40 8D 07 40 AD 0B 40 8D
57 4198:05 40 A2 00 A0 00 AD 09
A3 41A0:40 18 69 01 20 11 F4 AC
AF 41A8:05 40 AE 07 40 20 46 42
20 41B0:D0 16 AD 0E 40 D0 16 EE
51 41B8:09 40 20 F9 41 CE 09 40
4A 41C0:A9 01 8D 0E 40 4C CD 41
10 41C8:A9 00 8D 0E 40 EE 07 40
16 41D0:AD 07 40 C9 07 90 08 A9
20 41D8:00 8D 07 40 EE 05 40 AD
59 41E0:05 40 CD 0D 40 90 C0 D0
47 41E8:0A AD 07 40 CD 0C 40 90
BB 41F0:B6 F0 B4 20 19 42 4C 51
FF 41F8:40 AD 03 40 C9 64 B0 18
61 4200:EE 03 40 AE 03 40 AD 05
66 4208:40 9D 50 46 AD 07 40 9D
7D 4210:B4 46 AD 09 40 9D 18 47
4E 4218:60 AD 03 40 D0 03 68 68
51 4220:60 AE 03 40 BD 50 46 8D
4F 4228:05 40 BD B4 46 8D 07 40
40 4230:BD 18 47 8D 09 40 CE 03
B2 4238:40 60 B1 26 8D 16 40 BD
07 4240:17 40 2D 16 40 60 B1 26
48 4248:8D 16 40 E0 06 F0 0B E0
7A 4250:00 F0 19 BD 1E 40 2D 16
D2 4258:40 60 BD 1E 40 2D 16 40
96 4260:8D 13 40 C8 B1 26 29 01
1F 4268:0D 13 40 60 BD 1E 40 2D
7A 4270:16 40 8D 13 40 88 B1 26
17 4278:29 40 0D 13 40 60 AD 0B
52 4280:40 8D 11 40 A9 07 8D 12
BA 4288:40 20 C6 42 AD 10 40 18
B2 4290:6D 0A 40 AA 90 03 EE 0F
98 4298:40 AC 0F 40 AD 09 40 20
49 42A0:57 F4 AD 0D 40 8D 11 40
97 42A8:A9 07 8D 12 40 20 C6 42
89 42B0:AD 10 40 18 6D 0C 40 90
3E 42B8:03 EE 0F 40 AE 0F 40 AC
D8 42C0:09 40 20 3A F5 60 A9 00
24 42C8:8D 0F 40 8D 10 40 A2 08
6C 42D0:0A 2E 0F 40 0E 12 40 90
3F 42D8:09 18 6D 11 40 90 03 EE
C8 42E0:0F 40 CA D0 EB 8D 10 40
D2 42E8:60 A2 08 A9 07 8D 13 40
72 42F0:A5 06 8D 14 40 A5 07 0E
04 42F8:14 40 2A CD 13 40 90 06
56 4300:ED 13 40 EE 14 40 CA D0
91 4308:EE 8D 15 40 60

```

TOTAL: 431B

END OF LISTING 3

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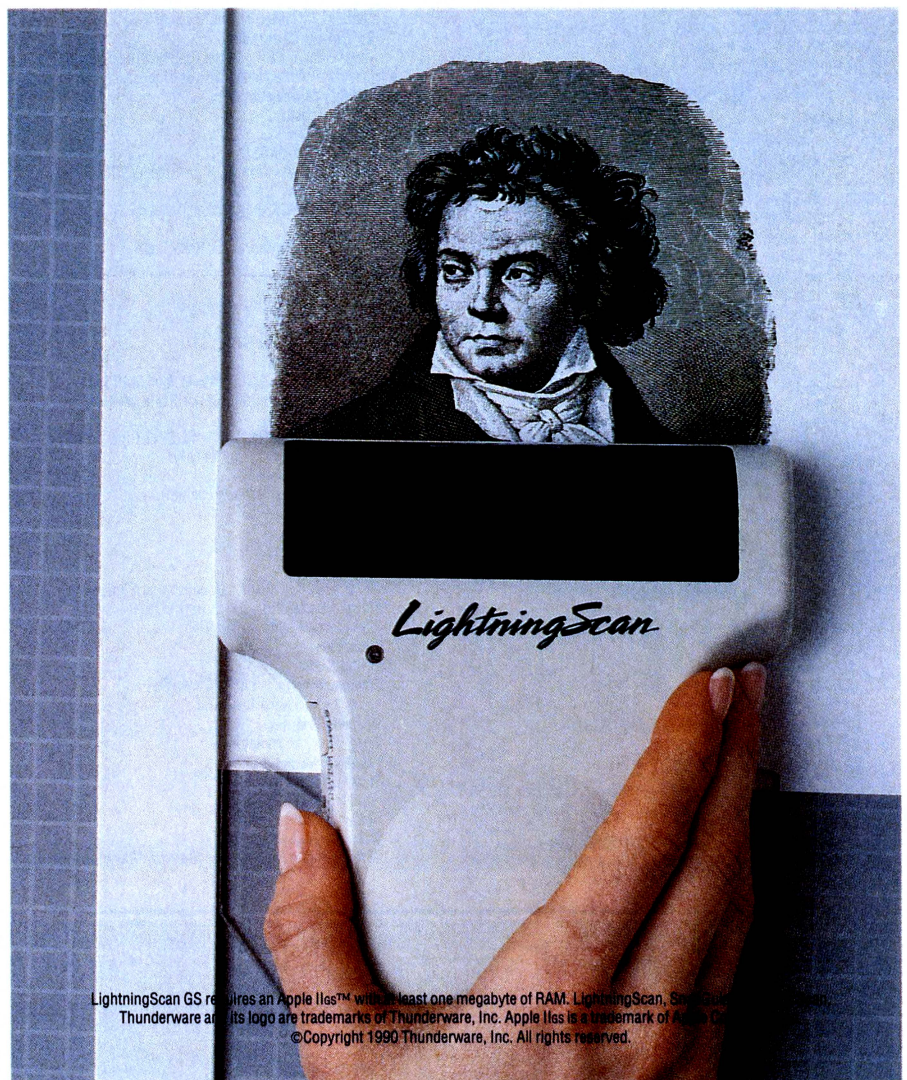


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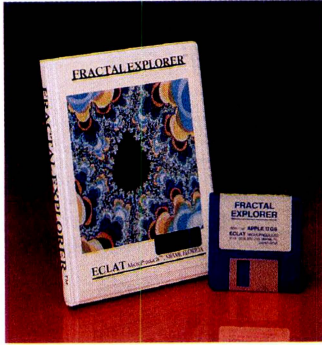
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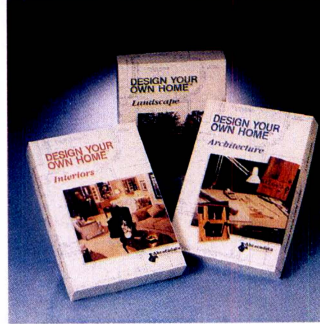
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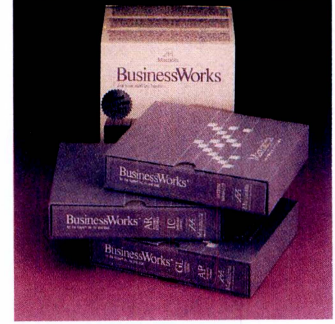
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Laser 128EX Computer.	439.
Laser 128EX II Computer (5¼).	459.
Laser 128EX II Computer (3½).	509.

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<b>Apple</b>	
GS/OS v5 (GS).	45.
<b>Central Point</b>	
Copy II Plus v9.0.	25.
<b>Glen Brodon</b>	
Dos Master or Pro.Cmd.	25.
ProSel 8 (5¼).	39.
ProSel 16 (3½).	59.
<b>Vitesse, Inc.</b>	
Exorcizer(GS).	29.
Salvation:Guardian(GS) or Renaissance(GS).	35.
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## Entertainment Software

<b>Accolade</b>	
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Bubble Ghost(GS).	24.
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Third Courier(GS) or Test Drive II(GS).	34.
<b>Activision</b>	
Rampage.	24.
Blackjack Academy(GS).	17.
Sky Travel(AP & GS).	34.
<b>Artworx</b>	
KaleidoKubes(GS).	14.
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Vegas Gambler(GS), Vegas Craps(GS) or Triango(GS).	27.
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Batman, Heavy Barrel, or Robo Cop.	23.
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Tomahawk(GS).	27.
Hunt for Red October(AP or GS).	22.
<b>ECLAT</b>	
Geographic Jigsaw(AP or GS).	30.
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Marble Madness(GS) or World Tour Golf(GS).	15.
Music Construction Set(GS) or Skate or Die(GS).	15.
Bards Tale II.	18.
Cartooners(GS), Bards Tale II(GS) or Pipe Dream.	22.
Zany Golf(GS) or King's Bounty.	26.
Earl Weaver Baseball.	SPECIAL 26.
Bards Tale III or Madden Football.	33.
Instant Synthesizer(GS).	35.
<b>FTL</b>	
Dungeon Master(GS).	27.
<b>Infocom</b>	
Zork Trilogy or Leather Goddesses of Phobos.	14.
Beyond Zork(AP or GS) or Battle Tech.	34.
Zork Zero, Journey or ShoGun.	34.
<b>Interplay</b>	
Battle Chess.	30.
Neuromancer(GS), Battle Chess(GS) or DragonWars(AP & GS).	32.
<b>Leisure Genius</b>	
Clue, Risk, or Scrabble.	27.
<b>Melbourne House</b>	
Quarterback(AP or GS).	19.
Barbarian(GS).	25.
War in Middle Earth(GS).	30.
<b>Micro League Sports</b>	
Micro League Baseball w/ General Manager & Stat.	24.

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F-15 Strike Eagle or Silent Service(AP or GS).	14.
<b>Micro Revelations</b>	
Xenocide(GS).	30.
<b>Mindscape</b>	
Paperboy(AP or GS).	25.
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Captain Blood(GS).	29.
Shadow Gate(GS), Uninvited(GS) or Deja Vu II(GS).	32.
Balance of Power 1990(GS) or Deja Vu(GS).	32.
<b>Origin Systems</b>	
Times of Lore(AP & GS) or WindWalker.	27.
Space Rogue, Knights of Legend or Omega(AP or GS).	34.
Ultima Trilogy(I, II & III), Ultima IV or Ultima V.	39.
<b>PBI Software</b>	
Sea Strike(GS).	29.
Strategic Conquest(GS).	35.
The Tower of Myraglen(GS) or Alien Mind(GS).	39.
<b>Sierra On-Line</b>	
Mother Goose(AP or GS).	19.
Thexder(AP or GS) or Silpheed(GS).	24.
Leisure Suit Larry(AP or GS).	26.
Gold Rush(AP or GS) or Black Cauldron(GS).	26.
Kings Quest IV(AP or GS).	32.
Kings Quest I, II or III (AP or GS).	32.
ManHunter New York(AP or GS) or Police Quest(AP or GS).	32.
<b>Software Toolworks</b>	
Cribbage/ Gin King(GS).	29.
Chessmaster 2100 or Life & Death(GS).	33.
Chessmaster 2100(GS) or Keef the Thief(GS).	33.
<b>So What Software</b>	
Sonix(GS).	35.
<b>Spectrum Holobyte</b>	
Solitaire Royale(GS).	22.
Tetris(AP & GS).	25.
<b>Strategic Simulations</b>	
War of Lance.	29.
AD&D Pool of Radiance.	30.
Battle of Napoleon or The Curse of the Azure Bonds(GS).	33.
Champions Krynn.	33.
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Jet.	27.
Flight Simulator II.	32.
<b>Taito</b>	
Arkanoïd, Bubble Bobble(AP & GS) or Renegade(AP & GS).	10.
Arkanoïd II(GS) or Rastan(GS).	24.
Oix(AP & GS).	24.
<b>Three Sixty</b>	
Warlock(GS) or Dark Castle(GS).	33.
<b>Victory Software</b>	
2088 The Cryllan Mission(GS).	45.

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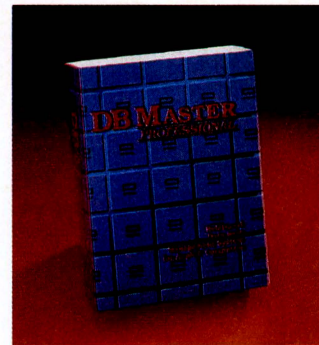
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## Utilities and Languages

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**Micol Systems**  
Micol Advanced Basic(GS) v3.0. . . . . 89.

**Roger Wagner**  
SoftSwitch(GS). . . . . 39.  
Merlin 8/16 (AP & GS). . . . . 75.

**So What Software**  
Hyper Launch(GS). . . . . 35.  
Call-Box(GS). . . . . 69.

**The Byte Works**  
ORCA/ Disassembler(GS). . . . . 32.  
ORCA/ DeskTop(GS). . . . . 34.

ORCA/ M Assembler(GS). . . . . 59.  
ORCA/ Design Master(GS). . . . . 59.

ORCA/ Pascal Desktop Debugger(GS). . . . . 80.  
ORCA/ C Desktop Debugger(GS). . . . . 80.

**TML Systems**  
TML Source Code Library II(GS). . . . . 35.  
TML Speech Toolkit(GS). . . . . 45.

TML Basic(GS) or TML Pascal II(GS). . . . . 82.

**Zedcor**  
ZBasic v4.0. . . . . 39.

## Accelerators/Ramcards/Z-80/80 Column Cards

**Apple Computer**  
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**Applied Engineering**  
PC Transporter Installation Kit IIE. . . . . 35.  
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ViewMaster 80 (// +). . . . . 129.  
GS-Ram 256K. . . . . 135.

RamWorks Basic 256K. . . . . 145.  
RamWorks III 256K. . . . . 159.

Ramkeeper. . . . . 155.  
TransWarp III Accelerator. . . . . 159.

GS-Ram 512K. . . . . 175.  
RamWorks III 512K. . . . . 199.

Z-Ram Ultra 1 512K. . . . . 229.  
Z-Ram Ultra 2 256K. . . . . 219.

GS-Ram Ultra 512K. . . . . 209.  
RamFactor 512K. . . . . 245.

GS-Ram 1MG or Z-Ram Ultra 2 512K. . . . . 249.  
Ram Express 512K. . . . . 239.

RamWorks III 1MG. . . . . 269.  
GS-Ram Ultra 1MG or GS-Ram Plus 1MG. . . . . 265.

RamFactor 1MG. . . . . 309.  
GS-Ram 1.5MG or Z-Ram Ultra 2 1MG. . . . . 325.

TransWarp Accelerator(GS). . . . . 305.  
Z-Ram Ultra 3 1MG. . . . . 395.

GS-Ram Ultra 2MG or GS-Ram Plus 2MG. . . . . 389.  
PC Transporter (768K). . . . . 309.

GS-Ram Plus 3MG. . . . . 515.

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C-Ram w/ 256K(C & C+). . . . . 159.  
C-Ram w/ 512K(C & C+). . . . . 195.

C-Ram w/ 1MB(C & C+). . . . . 269.

**Harris Laboratories, Inc.**  
GS Load Card. . . . . 55.  
GS Sauce Card. . . . . 85.

**Zip Technology**  
Zip Chip 4 MHZ. . . . . 129.  
Zip Chip 8 MHZ. . . . . 159.

## Printer Interface Cards

**Apple**  
SCSI Card. . . . . 115.  
Apple Super Serial Card. . . . . 119.

**Applied Engineering**  
Parallel Pro. . . . . 85.  
Serial Pro. . . . . 119.

**Orange Micro**  
Grappler Plus (AP & GS). . . . . 75.  
Grappler 9 pin. . . . . 78.

**SMT**  
No Slot Clock. . . . . 30.  
Print Tech II. . . . . 33.

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Finger Print GSI ver111

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Finger Print Plus (Specify Cables: Parallel,

Serial, or ImageWriter(II-II+ & IIE). . . . . 89.

**Xetec Inc.**  
Superwriter 924(GS,C+ ,C). . . . . 79.

## Accessories

**Advanced Graviss**  
Advanced Graviss' JoyStick(AP & GS). . . . . 39.  
MouseStick ADB(GS). . . . . 69.

**Apple Computer**  
Apple Mouse //c. . . . . 85.  
Apple Mouse //e. . . . . 129.

**Applied Engineering**  
TimeMaster II H.O. . . . . 85.  
Conserver(GS). . . . . 85.

Sonic Blaster(GS). . . . . 109.  
IBM Style Keyboard. . . . . 119.

Audio Animator(GS). . . . . 195.

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## CH Products

Hayes Mach III Joystick. . . . . 33.  
Hayes Flight Stick. . . . . 49.

Roller Mouse ADB(GS). . . . . 85.

**Digital Vision**  
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System Saver (Platinum or Beige). . . . . 59.

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New Turbo Mouse (Reg. or ADB). . . . . 109.

**Kraft**  
Kraft Universal 3 Button Joystick (IIe, IIc). . . . . 34.

**Koala Technologies**  
Koala Pad Plus w/ Graphics Exhibitor. . . . . 84.

**Kurta**  
IS ADB Tablet w/ stylus(GS). . . . . 289.

**Lynx Computer**  
Turbo Trackball (IIe or GS). . . . . 59.

**Mouse Systems**  
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A+ ADB Mouse (GS). . . . . 79.

**MousTrak**  
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MousePad 9" x 11" Size. . . . . 9.

MousePad L/F (Low Friction). . . . . 10.

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OCS 2-40 (Stereo Amplifier). . . . . 145.  
IBL Control 1 Speaker. . . . . 205.

**Practical Solutions**  
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ImageWriter Ribbon-Black six pack. . . . . 20.  
ImageWriter Rainbow Pack (6 Colors). . . . . 20.

**Street Electronics**  
Echo II B (AP & GS). . . . . 105.  
Echo II C (IIC & IIC+). . . . . 129.

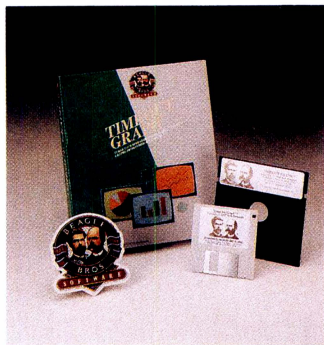
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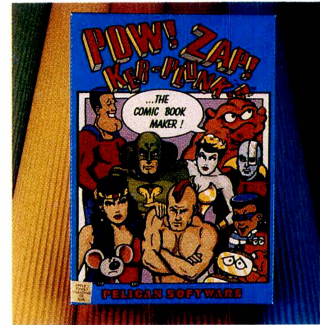
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ImageWriter II. . . . .	459.
<b>Brother</b>	
M-1109AP (ImageWriter Compatible). . . . .	225.
<b>Laser Computer, Inc.</b>	
Laser 190A w/ Serial Interface. . . . .	239.
<b>Seikosha</b>	
Seikosha SP 1000 (ImageWriter Compatible). . . . .	229.

## Disk Drives & Hard Disk SubSystems

<b>American Micro Research (Micro Sci)</b>	
Micro Sci C3 Controller. . . . .	52.
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A5D Half Height 5¼" Drive (IIGS Daisychain). . . . .	155.
AS800K 3.5 Ext. Drive. . . . .	195.
AMR 800K Drive Bundle. . . . .	235.
AMR D20/APS 20MB HD w/ SCSI(IIe & GS). . . . .	569.
AMR D60/APS 60MB HD w/ SCSI(IIe & GS). . . . .	799.
AMR 45MB Removable(AP & GS). . . . .	1079.
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Transdrive Half Height 360K. . . . .	119.
Transdrive 360K Single. . . . .	209.
Transdrive Dual 360K. . . . .	299.
Vulcan 20(AP or GS). . . . .	545.
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CT-20 Hard Drive(AP & GS). . . . .	505.
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CT-40c Hard Drive IIc. . . . .	775.
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SCSI Rom Upgrade. . . . .	25.
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DF4 40 Compact MB HD(IIe & GS). . . . .	895.
D7/T 70 MB HD(IIe & GS). . . . .	965.
DF7 Compact 70 MB HD(IIe & GS). . . . .	989.
<b>Laser Computer, Inc.</b>	
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Multi-Kache SCSI Option. . . . .	69.
Multi-Kache w/ 256K. . . . .	259.
Multi-Kache w/ 1 meg. . . . .	379.

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<b>Activision</b>	
Paintworks Gold(GS). . . . .	45.
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<b>Baudville</b>	
Award Maker Plus(AP & GS). . . . .	35.
816/ Paint. . . . .	45.
<b>Beagle Bros.</b>	
Beagle Draw(GS). . . . .	52.
<b>Berkeley Softworks</b>	
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GEOPublish. . . . .	65.
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Print Shop Graphics Library Sampler Edition(GS). . . . .	24.
Print Shop Graphics Library Party Edition(GS). . . . .	24.
Print Shop Companion. . . . .	25.
Print Shop(AP or C+). . . . .	29.
Dazzle Draw or Print Shop(GS). . . . .	39.
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Fractal Explorer(AP or GS). . . . .	SPECIAL 28.
<b>Electronic Arts</b>	
DeluxePaint II(GS). . . . .	35.
DeluxeWrite w/ Deluxe Paint II(GS). . . . .	59.
<b>Lynx Computer</b>	
Supergraphix 256 w/ music(GS). . . . .	69.
<b>Roger Wagner</b>	
Graphic Exchange(GS). . . . .	35.
<b>So What Software</b>	
Iconix(GS). . . . .	29.
<b>Spinmaker</b>	
Newsroom Clip Art Collection vol. 1, 2 or 3. . . . .	14.
Certificate Maker Library #1. . . . .	19.
Fonts For Springboard Publisher(GS). . . . .	19.
Certificate Maker or Newsroom. . . . .	26.
Springboard Publisher v2.0(AP or GS). . . . .	79.
<b>Thunderware</b>	
ThunderScan Apple (AP & GS). . . . .	SPECIAL 165.

<b>Virtual Reality Inc.</b>	
Visionary(GS). . . . .	279.
<b>Vitesse, Inc.</b>	
Quickie(AP or GS). . . . .	215.

## Communication Software

<b>Applied Engineering</b>	
ReadyLink. . . . .	69.
<b>Beagle Bros.</b>	
TimeOut TeleComm. . . . .	45.
Point-to-Point. . . . .	59.
<b>Compuserve</b>	
Compuserve Starter Kit. . . . .	24.
<b>L &amp; L</b>	
GBBS. . . . .	79.

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<b>Abracadata</b>	
Electronic Drawing. . . . .	32.
Everybody's Planner. . . . .	69.
<b>ACTAsoft</b>	
Alpha Check v3.0. . . . .	32.
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Wordbench (AP & GS). . . . .	SPECIAL 99.
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Beagle Bros. Clip Art 1 & 2(GS). . . . .	29.
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GS Font Editor or Program Writer. . . . .	29.
Timeout UltraMacros or SpreadTools. . . . .	37.
Beagle Bros. Desk Accessories(GS). . . . .	37.
Timeout SuperFonts or QuickSpell. . . . .	45.
Timeout ReportWriter or Beagle Write. . . . .	48.
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Beagle Write(GS). . . . .	59.
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<b>Claris</b>	
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Apple Works(GS). . . . .	209.
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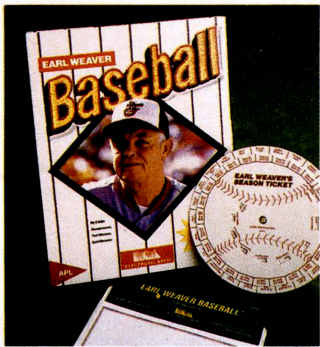
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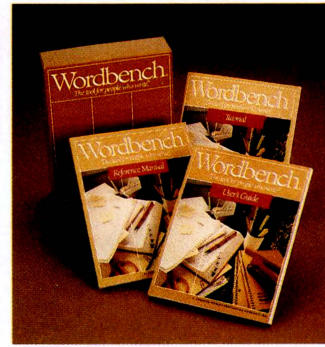
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**M**ost of your programs probably begin by displaying your name and the name of the program. This is fine, but it's easy to make your title screen much more attractive, even with a minimal display of text.

Using the BASIC command POKE, it is easy to create a title screen with moving characters that will catch the user's eye. Such dynamic displays require little code, use little memory or disk space, and can be easily bypassed with a keypress.

### "PRINTING" WITH POKE

Using POKE you can place values directly into specific memory locations (POKEing a short machine language routine into memory, for instance). Since the screen display is stored in the Apple's RAM, POKE also can be used to "print" to the text screen.

Figure 1 shows a map of the text screen memory. Apple's primary text screen uses RAM locations from 1024 to 2047. Any value POKEd into this area will be displayed on the screen. The 24 lines and 40 columns of the text screen require 960 bytes of memory. (The other 64 bytes, 8 each at the ends of lines 17 through 24, are used as scratchpad RAM for the eight peripheral slots.) Using Figure 1, you can determine the address of any screen memory location; for example, VTAB 20, HTAB 10 is memory location 1497 and VTAB 2, HTAB 3 is 1154.

*George Tylutki, P.O. Box 73, La Plume, PA 18440. This program is compatible with DOS 3.3 and ProDOS.*

Figure 2 provides a simplified table of the ASCII character set. Although there are 256 values in the full ASCII table, the 192 values shown here cover the usable range on the Apple II (excluding lowercase). Using the POKE command, you can "print" any character in the ASCII set, in NORMAL, INVERSE, or FLASH mode, anywhere on the text screen. For instance, POKE 1030,129 places a normal A at VTAB 1, HTAB 7. POKE 1030,65 places a flashing A at the same spot, and POKE 1030,1 places an inverse A there.

### WHY POKE INSTEAD OF PRINT?

Why not just use the PRINT command? There are several reasons for printing with POKE.

(1) Sometimes it is just simpler to use POKE. For example, POKE 1552, 26 is easier to type than VTAB 5: HTAB 17: INVERSE: PRINT "Z": NORMAL.

(2) It is easier to mix normal, inverse, and flashing characters using POKE. Instead of keying in 10 commands —

```
10 HOME: VTAB 7: HTAB 7: INVERSE:
PRINT "A": NORMAL: PRINT "A":
FLASH: PRINT "A": NORMAL
```

— you can key in 4 commands:

```
10 HOME: POKE 1798, 1: POKE 1799,
129: POKE 1800, 65
```

(3) You can POKE text into column 40 or line 24 without worrying about scrolling. For example, VTAB 24: HTAB 40: PRINT "!" causes the screen to scroll, but POKE 2039, 161 doesn't. You can also POKE inside or outside of text windows or anywhere else as many times as you want and wherever you want.

(4) It is easier to POKE dynamic displays than it is to PRINT them. Using only FOR...NEXT loops and POKE, you can move characters vertically or horizontally across the screen. To do the same thing using PRINT, you must use FOR...NEXT, HTAB, VTAB, often INVERSE, FLASH and NORMAL, and sometimes the MID\$, LEFT\$, and RIGHT\$ functions. By printing with POKE, you can highlight individual letters in a word or words in a line, create moving character displays, move a pointer on screen while waiting for a keypress, and so on.

### ENTERING THE PROGRAM

The program in Listing 1 demonstrates some of the possibilities of using POKE for printing, especially for animated displays. Type it in and save it with

Line	Col 1	Col 40
1:	1024	->....1063
2:	1152	->....1191
3:	1280	->....1319
4:	1408	->....1447
5:	1536	->....1575
6:	1664	->....1703
7:	1792	->....1831
8:	1920	->....1959
9:	1064	->....1103
10:	1192	->....1231
11:	1320	->....1359
12:	1448	->....1487
13:	1576	->....1615
14:	1704	->....1743
15:	1832	->....1871
16:	1960	->....1999
17:	1104	->....1143
18:	1232	->....1271
19:	1360	->....1399
20:	1488	->....1527
21:	1616	->....1655
22:	1744	->....1783
23:	1872	->....1911
24:	2000	->....2039

Figure 1: Text Screen Memory Locations

SAVE DYN.DISPLAYS

The program begins with an animated menu offering five choices — including the menu, you have six different demonstrations using POKE. Each demo (except #3) will ask you to type in a string of characters; then your string will be moved about the screen in interesting ways. Demo #4 does not move your string, but creates a moving border around it; you can change the border with a keypress.

The demos are contained in subroutines; each is a bit more complicated than its predecessor. In order to make the method of POKEing to the screen clearer, I have placed any lines that the subroutines share (look at the paddle for delay, clear the screen, get a key) in external subroutines. The program will run on any Apple in 40-column mode. It will run on the IIe in 80-column mode, although the menu pointer will be displaced. The complete ASCII table and text screen memory map can be found in the *Apple II Reference Manual*.

### BACK AND FORTH

It is easier to move characters across the screen than up and down the screen. To move an inverse asterisk (ASCII 42) horizontally requires that only one variable contain a screen memory location (L). Then, using a FOR...NEXT loop consecutive locations can be accessed. For example,

```
10 HOME: L=1408: FOR X = L TO
L+39: POKE X,42: POKE X,160:
NEXT
```

C	I	F	N	C	I	F	N
@	0	64	128	space	32	96	160
A	1	65	129	!	33	97	161
B	2	66	130	"	34	98	162
C	3	67	131	#	35	99	163
D	4	68	132	\$	36	100	164
E	5	69	133	%	37	101	165
F	6	70	134	&	38	102	166
G	7	71	135	'	39	103	167
H	8	72	136	(	40	104	168
I	9	73	137	)	41	105	169
J	10	74	138	*	42	106	170
K	11	75	139	+	43	107	171
L	12	76	140	,	44	108	172
M	13	77	141	-	45	109	173
N	14	78	142	.	46	110	174
O	15	79	143	/	47	111	175
P	16	80	144	0	48	112	176
Q	17	81	145	1	49	113	177
R	18	82	146	2	50	114	178
S	19	83	147	3	51	115	179
T	20	84	148	4	52	116	180
U	21	85	149	5	53	117	181
V	22	86	150	6	54	118	182
W	23	87	151	7	55	119	183
X	24	88	152	8	56	120	184
Y	25	89	153	9	57	121	185
Z	26	90	154	:	58	122	186
[	27	91	155	;	59	123	187
\	28	92	156	<	60	124	188
]	29	93	157	=	61	125	189
^	30	94	158	>	62	126	190
_	31	95	159	?	63	127	191

Figure 2: Values to POKE to Text Screen Memory (I = Inverse F = Flashing N = Normal)

The ASCII value for a space is 160; it erases the asterisk. Timing is important in moving displays. If you typed in the last line, you saw (or didn't see) the asterisk fly quickly across the screen. You can slow the movement down by inserting a delay loop.

```
10 HOME: L=1408: FOR X = L TO
L+39: POKE X, 42: FOR D = 1 TO
100: NEXT: POKE X, 160: NEXT
```

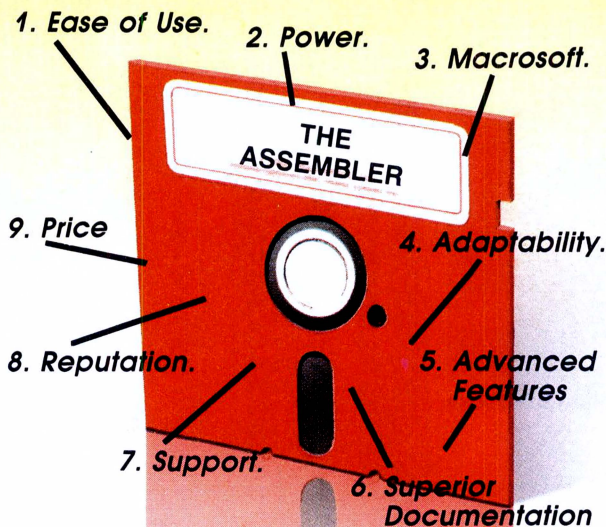
You can slow down or speed up the demonstrations by adjusting the number 100 in line 320. Also, GOSUBs and GOTOs cause delays. Proper timing requires experimentation. If you compile this program or any program with a moving display, the display will run much faster than it does in BASIC (often too fast, as with the menu pointer when paddle 0 is set to 0). Moving displays also can be written in assembly language or directly in machine code, and they run extremely fast.

### SIMPLE DEMO

In demos #1, #2, and #5 I use the MID\$ and ASC functions to demonstrate how to convert input from the keyboard to the proper values for POKEing (LN=Letter Normal, LI=Letter Inverse). This makes the

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demos more interesting because you can use your own strings instead of preprogrammed strings. Unlike lines 410-420, lines 510-540 will accept any input except commas and Control-C as the first character of the string. To run the demos without requiring input from the keyboard you should set up the variable values as in demo #3 (lines 620-630).

Demo #1 (lines 1310-1470) first asks you to type in a string of characters (GOSUB 510). Left to right, it prints each character of the string, first as INVERSE (line 1320) and then at the same screen location as NORMAL (line 1340). Thus, a white mask one character wide seems to move over the string. If you press a key during the demo (GOSUB 330), the mask reverses direction and moves right to left (lines 1390-1460). It will reverse direction each time you press a key. Lines 1380 and 1450 determine whether you have pressed the Escape key; if so, the program returns

*These techniques spruce  
up your programs without  
wasting disk space.*

to the menu via line 1470, which zeroes all variables, including arrays and strings, and sets the pointer value (CC) to 173 (the ASCII value of the dash). Demo #1 shows in a simple form how to move a character back and forth across the screen, highlighting individual characters within a string.

## UP AND DOWN

To move characters up and down the screen requires that a different variable contain each screen position (SP) (see lines 130 and 170). Line 130 first sets three variables for the loop in line 170: B = Beginning, E = End, and S = Step. SP(1) to SP(6) contain the values of the six screen memory locations, one below the other: VTAB 5, 7, 9, 11, 13, and 15, HTAB 9. At the beginning of the program, POKE -16368,0 clears the keyboard strobe for the first PEEK (-16380) in line 330. After the menu is printed to the screen, line 170 POKES each of the six vertical screen locations with the value of CC, which is set to 190 (>) in line 110. The value of CC (the pointer) is changed after each demo. I could have drawn an arrow (--->), but I wanted to keep things simple.

GOSUB 320 establishes the delay between each POKE. POKE SP(X), 160 erases the pointer. Thus, the pointer is POKED to the screen in front of each numbered menu choice, erased, and then POKED to the line below. K is a flag indicating that a key has been pressed (GOSUB 260). The ON...GOTO in line 210 sends the program to the appropriate subroutine, because the ASCII value of "1" is 177, "2" is 178, etc., and subtracting 176 from P will yield 1, 2, and so on. If no key is pressed, the pointer is moved six times down the screen. Then execution of the program continues at line 170, only now the pointer is moved up the screen, because line 180 reverses the values of the loop (B becomes E, E becomes B, and the step becomes negative). The menu illustrates the basic technique of using POKE to move characters vertically.

## NOTES

Each screen line is composed of 40 consecutive memory locations. However, lines are not stored consecutively in memory: Location 1063 is the last column of line 1, but 1064 is the first column of line 9 (Figure 1). Therefore, if you enter a string longer than 19 characters in demo #5, the characters will not jump over or under to the next line but to the eighth line below. Try it.

Notice in demo #5 (lines 810 and 840) that changing one value (D) is all that is necessary to make the characters move over or under the string printed on screen line 9 (1064). If D=1192, the characters will move under; if D=1920, they will move over. This also illustrates one reason for using variables rather than constants: The functions of complex statements can be easily modified. Using variables also speeds up program execution in Applesoft.

Three blank spaces (ASCII 160) are added to the end of the data string in demo #3 (line 630) to bring the characters down out of the air in the loop (line 700).

Line 1080 sets the two values that are POKEed for the border (demo #4) to the dash (—) and underline (—) characters. When the demo is first run, alternately POKEing the two values makes it appear that one character is jumping up and down.

Dynamic displays such as these will not replace multicolor Hi-Res displays. However, you can spruce up your programs using this technique without wasting disk space, memory space, your programming time, or the program user's time.

## LISTING 1: DYN.DISPLAYS

```

37 10 REM *****
C0 20 REM * DYN.DISPLAYS
B9 30 REM * BY GEORGE TYLUTKI *
AE 40 REM * COPYRIGHT (C) 1990 *
CB 50 REM * MINDCRAFT PUBL. CORP. *
24 60 REM * CONCORD, MA 01742 *
45 70 REM *****
3A 80 REM
41 90 REM INITIAL MENU
1C 100 REM
2E 110 PRINT CHR$(21):CC = 190: HOME
48 120 PRINT "POKING DYNAMIC DISPLAYS BY G. TYLUT
KI": PRINT "COPYRIGHT(C) 1990 MINDCRAFT PUB
L. CORP.": POKE 34,3
0D 130 S = 1:B = 1:E = 6:SP(1) = 1544:SP(2) = 1800
:SP(3) = 1072:SP(4) = 1328:SP(5) = 1584:SP(
6) = 1840: POKE - 16368,0
7E 140 HOME : PRINT
94 150 HTAB 10: PRINT "1--SIMPLE DEMO": PRINT :
HTAB 10: PRINT "2--ALMOST AS SIMPLE": PRIN
T : HTAB 10: PRINT "3--WAVING": PRINT : HTA
B 10: PRINT "4--BORDER": PRINT : HTAB 10:
PRINT "5--OVER/UNDER": PRINT : HTAB 10:
PRINT "6--EXIT"
9F 160 PRINT : PRINT : PRINT : HTAB 10: PRINT "EN
TER CHOICE"
49 170 FOR X = B TO E STEP S: POKE SP(X),CC: GOSU
B 320: GOSUB 330: POKE SP(X),160: IF K THEN
190
3E 180 NEXT :C = B:B = E:E = C:S = - S: GOTO 170
: REM CHANGE DIRECTION
EA 190 P = P - 176: IF P < 1 OR P > 6 THEN 170
E9 200 HOME
73 210 ON P GOTO 1310,1530,610,1030,800
EB 220 TEXT : HOME : END
5E 230 REM
6B 240 REM -----
10 250 REM SHARED SUBROUTINES
B9 260 REM -----
D2 270 REM
36 280 HOME : VTAB 20: PRINT "PADDLE 0 CONTROLS S
PEED": RETURN

```

```

89 290 VTAB 21: PRINT "ESC TO RETURN TO MAIN MENU
": RETURN
3B 300 VTAB 22: PRINT "19 CHARACTERS MAXIMUM PLEA
SE ": RETURN
C9 310 VTAB 23: PRINT "ANY KEY CHANGES DIRECTION"
: RETURN
14 320 FOR I = 1 TO 100: NEXT : RETURN
4D 330 K = 0:P = PEEK ( - 16380): POKE - 16368,0
: IF P > 127 THEN K = 1: REM CHECK KEYBOAR
D FOR KEY PRESS
7B 340 RETURN
AE 350 REM
97 360 REM -----
7C 370 REM CONVERT STRING INTO
9F 380 REM INTO NORMAL POKE VALUE
62 390 REM -----
2B 400 REM
CC 410 HTAB 1: VTAB 4: INPUT "ENTER A STRING (UP
TO 39 CHARACTERS) " :S$
10 420 L = LEN (S$): DIM LN(L): IF L > 39 OR L =
0 THEN VTAB 4: HTAB 1: PRINT " ": CALL -
958: GOTO 410
A8 430 FOR X = 1 TO L:LN(X) = ASC ( MID$ (S$,X,1
)) + 128: NEXT : RETURN
B7 440 REM
B2 450 REM -----
39 460 REM CONVERT STRING TO
40 470 REM NORMAL AND INVERSE
25 480 REM POKE VALUES
46 490 REM -----
11 500 REM
27 510 HTAB 1: VTAB 4: INPUT "ENTER A STRING (UP
TO 39 CHARACTERS) " :S$:L = LEN (S$): IF
L > 39 OR L = 0 THEN VTAB 4: HTAB 1: PRIN
T " ": CALL - 958: GOTO 510
8F 520 DIM LN(L),LI(L)
7C 530 FOR X = 1 TO L:LN(X) = ASC ( MID$ (S$,X,1
)) + 128:LI(X) = ASC ( MID$ (S$,X,1)) - 64
89 540 IF LI(X) < 0 THEN LI(X) = LI(X) + 64: REM
LEAVE CONTROL CHARS AND OTHERS WITH ASCII
VALUE<64 ALONE
F5 550 NEXT : RETURN
03 560 REM
FE 570 REM -----
0B 580 REM WAVING IN THE AIR
E8 590 REM -----
30 600 REM
8A 610 GOSUB 290
E6 620 DIM LN(20): FOR X = 1 TO 20: READ LN(X):
NEXT
F5 630 DATA 151,129,150,137,142,135,160,1
37,142,160,148,136,133,160,129,137,146,160,
160,160: REM ASCII VALUES FOR WAVING IN
THE AIR'
D8 640 FOR X = 1 TO 17: POKE 1550 + X,LN(X): NEXT
B1 650 FOR X = 1 TO 3
EA 660 POKE 1422 + X,LN(X): POKE 1550 + X,160
DA 670 GOSUB 320: GOSUB 330: IF P = 155 GOTO 740
23 680 NEXT
AE 690 FOR X = 1 TO 17
8B 700 POKE 1422 + X + 3,LN(X + 3): POKE 1550 + X
+ 3,160: POKE 1550 + X,LN(X): POKE 1422 +
X,160
E7 710 GOSUB 320: GOSUB 330: IF P = 155 GOTO 740
FB 720 NEXT
57 730 GOTO 650
99 740 CLEAR :CC = 190: GOTO 130
87 750 REM
80 760 REM -----
81 770 REM OVER/UNDER
96 780 REM -----
7D 790 REM
58 800 REM
4D 810 D = 1192
25 820 VTAB 4: HTAB 1: PRINT "OVER OR UNDER? (O/U
) " : GET B$: PRINT B$: IF B$ < > "O" AND
B$ < > "o" AND B$ < > "U" AND B$ < > "u"
AND B$ < > CHR$(27) THEN 820
AD 830 IF B$ = CHR$(27) THEN 140
9C 840 IF B$ = "O" THEN D = 1920
07 850 HTAB 1: VTAB 4: INPUT "ENTER A STRING (UP
TO 19 CHARACTERS) " :S$: IF LEN (S$) > 1

```

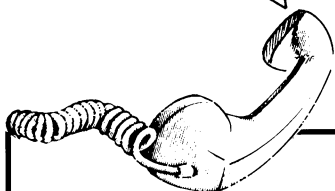
LISTING 1: DYN.DISPLAYS *continued*

```

          9 OR LEN (S$) = 0 THEN HTAB 1: VTAB 4:
          CALL - 958: GOTO 810
EC 860 GOSUB 420
5E 870 FOR X = 1 TO L: POKE 1064 + X, LN(X): NEXT
F6 880 FOR X = 1 TO L
93 890 POKE 1064 + X, 160
EC 900 FOR J = X + 1 TO L + X
DC 910 POKE D + J, LN(X): GOSUB 320: POKE D + J, 16
    0
62 920 NEXT
8A 930 POKE 1064 + X + L + 1, LN(X)
D4 940 NEXT
28 950 CLEAR
83 960 VTAB 20: PRINT "DO IT AGAIN? (Y/N) ";; GET
    A$: PRINT A$: IF A$ = "Y" OR A$ = "y" THEN
    VTAB 3: HTAB 1: CALL - 958: GOTO 810
1B 970 CLEAR :CC = 190: GOTO 130
A2 980 REM
E5 990 REM -----
03 1000 REM BORDER
02 1010 REM -----
09 1020 REM
DD 1030 HOME
43 1040 GOSUB 510:A$ = S$
FE 1050 REM VTAB 4: INPUT "ENTER A STRING PLEASE
    ";A$: IF LEN (A$) > 40 OR LEN(A$)=0 THEN
    1030
08 1060 VTAB 14: HTAB (40 - INT ( LEN (A$))) / 2
    : PRINT A$
92 1070 E(1) = 1615:E(2) = 1743:E(3) = 1871
6E 1080 LN = 159:LI = 173
A2 1090 VTAB 19: PRINT "PRESS ANY KEY TO CHANGE B
    ORDER": GOSUB 290
6C 1100 FOR X = 0 TO 39: POKE 1448 + X, LN: NEXT
9E 1110 FOR X = 1 TO 3: POKE E(X), LN: NEXT
99 1120 FOR X = 0 TO 39: POKE 1999 - X, LN: NEXT
48 1130 FOR X = 3 TO 1 STEP - 1: POKE E(X) - 39,
    LN: NEXT

```

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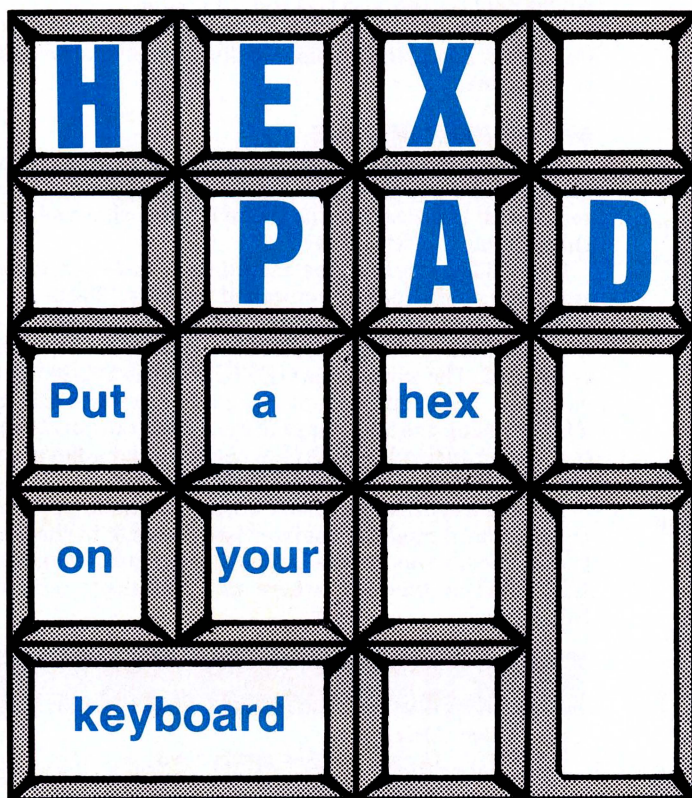
```

94 1140 FOR X = 0 TO 39: POKE 1448 + X, LI: GOSUB
    320: POKE 1448 + X, LN
4B 1150 POKE 1999 - X, LI: GOSUB 320: POKE 1999 -
    X, LN
FD 1160 GOSUB 330: IF K = 1 THEN GOSUB 1210
06 1170 NEXT
3D 1180 FOR X = 1 TO 3: POKE E(X), LI: POKE E(X), L
    N
72 1190 POKE E(4 - X) - 39, LI: POKE E(4 - X) - 39
    , LN
E2 1200 GOTO 1140
FE 1210 IF P = 155 THEN POP : CLEAR :CC = 190:
    GOTO 130
A8 1220 IF P > 192 THEN LI = P - 192:LN = P: GOTO
    1250
54 1230 IF P > 127 THEN LI = P - 128:LN = P: GOTO
    1250
0E 1240 RETURN
D3 1250 POP : GOTO 1100
92 1260 REM
73 1270 REM -----
78 1280 REM SIMPLE DEMO
7F 1290 REM -----
42 1300 REM
E4 1310 GOSUB 510: GOSUB 310: GOSUB 290
0D 1320 FOR X = 1 TO L: POKE 1920 + X, LI(X)
EE 1330 GOSUB 320
BE 1340 POKE 1920 + X, LN(X)
52 1350 NEXT X
3B 1360 GOSUB 330: IF K GOTO 1380
91 1370 GOTO 1320
EE 1380 IF P = 155 GOTO 1470
37 1390 FOR X = L TO 1 STEP - 1: POKE 1920 + X, L
    I(X)
B9 1400 GOSUB 320
4C 1410 POKE 1920 + X, LN(X)
28 1420 NEXT X
8C 1430 GOSUB 330: IF K GOTO 1450
C5 1440 GOTO 1390
EC 1450 IF P = 155 GOTO 1470
EF 1460 GOTO 1320
41 1470 CLEAR :CC = 190: GOTO 130
16 1480 REM
EF 1490 REM -----
F4 1500 REM ALMOST AS SIMPLE
9B 1510 REM -----
32 1520 REM
89 1530 GOSUB 510
D7 1540 GOSUB 290: GOSUB 310
07 1550 FOR X = 1 TO L: POKE 1920 + X, LN(X)
A6 1560 GOSUB 320
79 1570 NEXT X
7B 1580 GOSUB 330: IF K GOTO 1640
40 1590 FOR X = 1 TO L: POKE 1920 + X, LI(X)
98 1600 GOSUB 320
19 1610 NEXT X
67 1620 GOSUB 330: IF K GOTO 1640
E7 1630 GOTO 1550
EB 1640 IF P = 155 GOTO 1760
69 1650 FOR X = L TO 1 STEP - 1: POKE 1920 + X, L
    N(X)
4F 1660 GOSUB 320
CB 1670 NEXT X
A3 1680 GOSUB 330: IF K GOTO 1740
3F 1690 FOR X = L TO 1 STEP - 1: POKE 1920 + X, L
    I(X)
10 1700 GOSUB 320
76 1710 NEXT X
CB 1720 GOSUB 330: IF K GOTO 1740
EE 1730 GOTO 1650
A7 1740 IF P = 155 GOTO 1760
96 1750 GOTO 1550
F4 1760 CLEAR :CC = 190: GOTO 130

```

TOTAL: 5253

END OF LISTING 1



**E**ntering hexadecimal numbers on a normal keyboard can be a frustrating experience. The digits 0 through 9 are all in a row at the top, and A through F are scattered about the keyboard. Even though a numeric keypad eases the task of decimal data entry, it offers little help in entering hexadecimal data.

However, if you own an Apple IIGS, help is available. By using HexPad, you can configure your numeric keypad to act as a hexadecimal keypad, with the digits 0 through F within easy reach of one hand. In addition to the letters, you also gain a space character on the keypad. It may take some practice before using HexPad becomes second nature, but the time and effort is well worth it.

Even if you don't enter much hex data, you may still find HexPad's decimal mode useful. In this mode, any key on the numeric keypad can be changed to a comma key. This can be a great time-saver when typing lengthy DATA statements.

#### USING THE PROGRAM

To install HexPad, boot into ProDOS and type BRUN HEXPAD. HexPad then makes sure that it is running on an Apple IIGS. If so, an installation message will be displayed.

HexPad recognizes the four commands listed in Table 1. After a command has been entered, HexPad sends a "cancel input" signal (Control-X) to Applesoft. This means that any pending input will be cancelled when a command is executed. For this reason, you should enter the HexPad commands only at the beginning of a line, unless you don't want the characters that you have already entered to be acted upon.

The default mode is normal, in which the numeric keypad acts in the same way that it would without HexPad.

Table 1: HexPad Commands

Keypress	Function
Open-Apple-D	Set decimal mode
Open-Apple-H	Set hexadecimal mode
Open-Apple-N	Set normal mode
Open-Apple-C<keypad key>	Maps the comma to <keypad key> in decimal mode

In hexadecimal mode, several keys on the numeric keypad are mapped to other characters, as shown in Table 2. For instance, when you press the Clear key, a capital A is generated instead of the normal Control-X code. You can still generate all of the keypad characters by using the equivalent keys on the keyboard. For instance, to generate the "=" character, use the equals sign on the keyboard rather than on the keypad.

In decimal mode, the comma is mapped to one of the keypad keys, and all of the other keys behave normally. You can choose which key you wish to act as a comma with the Configure command. Type Open-Apple-C followed by a keypad key. The key you select will act as a comma. The default key is the minus sign.

*Mark A. Heath, 2001 Pearson Drive, Midwest City, OK 73110. This program is compatible with the Apple IIGS only.*

**Table 2: Remapped Keys in Hexadecimal Mode**

Keypad Key	Character generated
Clear	A
=	B
/	C
*	D
+	E
-	F
.	Space

HexPad can be disconnected with the command `IN#0`. If you wish to reconnect HexPad, use the command `IN#A$300`. From within a program, the commands should be executed as

```
PRINT CHR$(4); "IN#0"
```

and

```
PRINT CHR$(4); "IN#A$300"
```

HexPad will also be disconnected if you press Control-Reset, type `PR#3`, or type Escape-Control-Q while the 80-column firmware is active. The `IN#A$300` command will reconnect HexPad in these cases as well.

## ENTERING THE PROGRAM

If you have an assembler, type in the source code in Listing 1. The `XC` command in line 27 tells the Merlin Pro assembler to generate 65C02 opcodes. If you're not using Merlin Pro, omit this line. Assemble the program and save the object code with the filename `HEXPAD`.

If you don't have an assembler, enter the Monitor with `CALL -151` and type in the hex code in Listing 2. While still in the Monitor, type the command

```
230<2000.2168M
```

Press Control-C and Return, and then type

```
BSAVE HEXPAD,A$230,L$169
```

## Updating Checkit

HexPad can be a great aid when entering long hex listings. *Nibble's* Checkit program can also be quite helpful. However, Checkit contains its own input routine and will bypass HexPad if it is installed.

Fortunately, Checkit can be easily updated to accommodate HexPad. Follow these steps:

1. Type `LOAD CHECKIT`
2. Enter the following Applesoft lines:

```
55 PRINT CHR$(4); "HEXPAD"
100 POKE 216,0: POKE 921,0: DIM H(3): H(0) =
1: H(1) = 16: H(2) = 256: H(3) = 4096
140 POKE 921,1: VTAB 10: CALL -958: PRINT "WHAT
IS THE STARTING ADDRESS OF THE": PRINT "FILE
(IN HEX)": INPUT H$: GOSUB 290: A = H
155 IF A < 1024 THEN POKE 0,0
260 IF PEEK(921) = 1 THEN PRINT "ENTER
THE MONITOR BY TYPING": PRINT "CALL -151"
335 IF PEEK(0) THEN POKE 5634,0: POKE 5635,3
375 IF PEEK(0) THEN POKE 34050,0: POKE 34051,3
```

3. Type `SAVE CHECKIT.HP`

Now, to enter a program using HexPad and Checkit on an Apple IIGS, type `RUN CHECKIT.HP`. HexPad will be installed automatically. Remember, you still have to enter Open-Apple-H or Open-Apple-D to switch HexPad out of normal mode.

If you enter a hexadecimal file with a starting address below \$400, HexPad will be disconnected. This prevents HexPad from being overwritten while it is active (which would cause `BASIC.SYSTEM` to crash).

While using `CHECKIT.HP`, do not type `IN#A$300` (or any `IN#...` command). This will disconnect the Checkit input routines.

## HOW THE PROGRAM WORKS

HexPad performs its keypad remapping by intercepting all keyboard input. If the key that was pressed is to be remapped, HexPad returns the remapped character rather than the actual keypress.

Lines 33-95 contain the installation code for HexPad, while the main code is contained in lines 100-206.

When keyboard input is requested by a program, control is transferred (via the `BASIC.SYSTEM` I/O routines) to line 102. The subroutine `GETKEY` (lines 202-206) is then executed. This routine first checks to see if `BASIC.SYSTEM` is using the 80-column firmware for output. If so, the firmware routine `BASICIN` is used to read a keypress. If not, the Monitor routine `KEYIN` is called.

After a keypress has been obtained, the keypad bit in the keyboard modifier register (see Table 3) is checked. If the keypress was in the keypad, then control passes to `KEYPAD` at line 137, where any necessary remapping takes place.

**Table 3: Keyboard Modifier Register \$C025**

Bit	Value	Description
7	0	Open-Apple key not pressed
	1	Open-Apple key pressed
6	0	Closed-Apple (option) key not pressed
	1	Closed-Apple (option) key pressed
5	0	No update since last keypress
	1	Modifier register has been changed since last keypress
4	0	Keypad key not pressed
	1	Keypad key pressed
3	0	Autorepeat inactive
	1	Autorepeat active
2	0	Caps lock inactive
	1	Caps lock active
1	0	Control key not pressed
	1	Control key pressed
0	0	Shift key not pressed
	1	Shift key pressed

If a keypad key was not pressed, the Open-Apple key is checked in line 111. If it was pressed, `CHKCMD` at line 118 is executed. This routine checks for any command characters, and takes appropriate action.

## MODIFICATIONS

One possible modification to HexPad would be the addition of new modes. In addition, more remapping could take place while in decimal mode.

When making changes to HexPad, be sure that the end of the program does not exceed \$3CF, since the area at \$3D0 and above is reserved. If your program becomes too long, you may have to change the `ORG` address.

## LISTING 1: HEXPAD Source Code

```

1 *****
2 * HEXPAD Source Code *
3 * BY MARK A. HEATH *
4 * COPYRIGHT(C) 1990 *
5 * MINDCRAFT PUBL. CORP. *
6 * CONCORD, MA 01742 *
7 *****
8
9 * MERLIN PRO ASSEMBLER
10
11 HPFLAG EQU $00 ;NEGATIVE IF HEXPAD IS INSTALLED
12 CANCEL EQU $98 ;CTRL-X
13 INBUF EQU $200 ;INPUT BUFFER
14 SYNTAX EQU $A677 ;BASIC.SYSTEM COMMAND PARSER
15 ERRROUT EQU $BE09 ;BASIC.SYSTEM ERROR HANDLER
16 VECTOUT EQU $BE30 ;BASIC.SYSTEM'S OUTPUT LINK
17 MODIFIER EQU $C025 ;MODIFIER KEY REGISTER
18 BASICIN EQU $C305 ;80-COL FIRMWARE INPUT
19 MAINID EQU $FB83 ;MAIN ID BYTE FOR GS
20 SUBID1 EQU $FBC0 ;1ST SUB ID BYTE
21 SUBID2 EQU $FBBF ;SECOND SUB ID BYTE
22 KEYIN EQU $FD1B ;READ THE KEYBOARD
23 COUT EQU $FDED ;OUTPUT A CHARACTER
24 IDROUTINE EQU $FE1F ;GS ID ROUTINE
25
26 ORG $230
27 XC ;65C02 OPCODES
28
29 *****
30 * INSTALLATION CODE: *
31 *****
32
33 * LOOK FOR GS ID BYTES:
34
35 LDA MAINID
36 CMP #$06
37 BNE NOTGS
38 LDA SUBID1
39 CMP #$E0
40 BNE NOTGS
41 LDA SUBID2
42 BNE NOTGS
43
44 * ID BYTES OK, BUT ARE THE SAME AS A IIE.
45 * MAKE SURE WE HAVE A GS
46
47 SEC

```

```

48 JSR IDROUTINE
49 BCS NOTGS
50 LDA #$FF ;FLAG THAT HEXPAD WAS
51 STA HPFLAG ;INSTALLED
52
53 * WE ARE RUNNING ON A GS, SO SET BASIC.SYSTEM
54 * INPUT VECTORS TO THE HEXPAD CODE
55
56 LDX #0
57 :LOOP LDA CMDSTR,X ;MOVE 'IN#A$300' TO INBUF
58 STA INBUF,X
59 BEQ :DONE
60 INX
61 BRA :LOOP
62 :DONE JSR SYNTAX ;PARSE & EXECUTE THE COMMAND
63 BCC PRMSG ;NO ERRORS
64 JMP ERRROUT
65
66 * PRINT THE INSTALLATION MESSAGE
67
68 PRMSG LDX #0
69 :LOOP LDA MSG,X
70 BEQ OUT ;MSG ENDS WITH ZERO
71 JSR COUT
72 INX
73 BRA :LOOP
74
75 * NOT A GS, TELL USERS.
76
77 NOTGS LDX #0
78 STX HPFLAG ;HEXPAD WAS NOT INSTALLED
79 :LOOP LDA NOTGSTXT,X
80 BEQ OUT ;MSG ENDS WITH ZERO
81 JSR COUT
82 INX
83 BNE :LOOP
84 OUT RTS
85
86 CMDSTR ASC 'IN#A$300',0D,00
87
88 MSG ASC "HexPad has been installed.",8D,8D
89 ASC "Disconnect with IN#0",8D,8D
90 ASC "Reconnect with IN#A$300",8D,8D,00
91
92 NOTGSTXT ASC "HEXPAD REQUIRES AN APPLE IIGS.",8D,00
93
94 DS \ ;START CODE AT $300
95
96 *****

```

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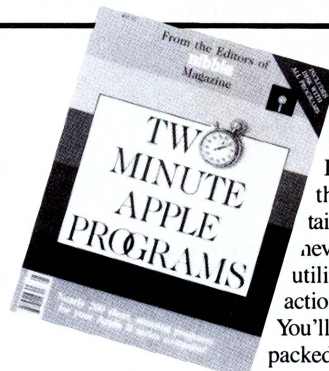
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# LISTING 1: HEXPAD Source Code *continued*

```

97 * HEXPAD INTERCEPT CODE:      *
98 .....
99
100 * CHECK FOR KEYPAD OR OPEN APPLE KEY:
101
102     CLD                :BASIC.SYSTEM REQUIREMENT
103     JSR    GETKEY      :GET A CHARACTER
104     PHX                :SAVE X-REG
105     PHA                :SAVE CHAR.
106     LDX    PADMODE     :GET PADMODE IN X REG.
107     LDA    MODIFIER    :CHECK FOR KEYPAD
108     AND    #$10        :KEYPAD KEY?
109     BNE    KEYPAD      :YES
110     LDA    MODIFIER    :CHECK FOR APPLE KEY
111     BMI    CHKCMD      :YES, CHECK FOR COMMAND KEY
112 EXIT1  PLA            :GET CHAR OFF STACK
113     PLX                :RESTORE X
114     RTS                :DONE
115
116 * CHECK FOR COMMAND:
117
118 CHKCMD  PLA            :GET KEY FROM STACK
119     PHA                :AND SAVE IT AGAIN
120     AND    #$DF        :FORCE UPPERCASE
121     LDX    #00         :INIT X-REG (MODE BYTE)
122     CMP    #"N"        :IS IT AN "N"?
123     BEQ    SETMODE     :YES, SET HEXPAD TO NORMAL
124     INX                :01=HEX MODE
125     CMP    #"H"        :IS IT A "H"?
126     BEQ    SETMODE     :YES, SET HEX MODE
127     INX                :02=DEC. MODE
128     CMP    #"D"        :IS IT "D"?
129     BEQ    SETMODE     :YES, SET DECIMAL MODE
130     CMP    #"C"        :IS IT A "C"?
131     BEQ    CONFIG      :YES, CONFIGURE 'COMMA'
132     BRA    EXIT1
133
134 * KEYPAD PRESS: HOW SHOULD IT
135 * BE HANDLED?
136
137 KEYPAD  TXA            :CHECK MODE
138     BEQ    EXIT1      :NO ACTION
139     CMP    #2         :DEC MODE?
140     BNE    K2         :NO
141     PLA            :YES, GET KEY
142     BRA    GETNEWKEY
143 K2      LDY    #0      :INIT Y (NEW KEY OFFSET)
144     PLA            :GET THE KEY
145     CMP    #$98       :WAS THE CLEAR KEY PRESSED?
146     BEQ    GETNEWKEY  :YES
147     INY            :CHECK THE NEXT ONE
148     CMP    #"="       :WAS "=" PRESSED?
149     BEQ    GETNEWKEY  :YES
150     INY
151     CMP    #"/"
152     BEQ    GETNEWKEY
153     INY
154     CMP    #"."
155     BEQ    GETNEWKEY
156     INY
157     CMP    #"+"
158     BEQ    GETNEWKEY
159     INY
160     CMP    # "-"
161     BEQ    GETNEWKEY
162     CMP    #","       :WAS THE KEY A PERIOD?
163     BNE    EXIT2      :NO 'HOT' KEY PRESSED
164     LDA    #$A0       :CHANGE PERIOD TO SPACE
165     BRA    EXIT2
166
167 * SET HEXPAD MODE:
168 * X=0 -> NORMAL X=1 -> HEX X=2 -> DEC
169
170 SETMODE  STX    PADMODE :SAVE MODE BYTE
171     PLA            :REMOVE OLD CHAR.
172     LDA    #CANCEL    :FAKE CTRL-X
173
174 EXIT2    PHA            :PUSH THE CHAR IN A
175     BRA    EXIT1
176
177 * CONFIGURE COMMA KEY IN DECIMAL MODE
178
179 CONFIG   JSR    GETKEY  :GET ANOTHER KEY
180     STA    GI+1        :STUFF IT IN CMP STMT.
181     PLA            :REMOVE OLD CHAR.
182     LDA    #CANCEL    :FAKE CTRL-X
183     BRA    EXIT2
184
185 * CHANGE KEY ACCORDING TO MODE:
186
187 GETNEWKEY DEX          :ARE WE IN HEX MODE?
188     BEQ    HEX         :YES
189     INX                :RESTORE MODE
190 G1      CMP    # "-"    :WE'RE IN DECIMAL, ONLY "-"
191     BNE    EXIT2      :MEANS ANYTHING
192     LDA    #","        :CHANGE THE KEY TO ','
193     BRA    EXIT2
194 HEX     INX            :SET PADMODE BACK TO HEX
195     TYA            :GET KEY OFFSET
196     CLC
197     ADC    #"A"        :ADD THE OFFSET TO ASC("A")
198     BRA    EXIT2
199
200 * GET A KEYPRESS FROM THE APPROPRIATE PLACE:
201

```

```

202 GETKEY  LDY    VECTOUT+1 :IS BASIC.SYSTEM USING THE
203     CPY    #$C3         :80 COL FIRMWARE IN SLOT 3?
204     BNE    :GK1         :NO
205     JMP    BASICIN      :YES, USE THE SLOT 3 INPUT
206 :GK1     JMP    KEYIN    :NO, USE STANDARD INPUT
207
208 PADMODE  DFB    0       :HEXPAD MODE VARIABLE

```

END OF LISTING 1

## LISTING 2: HEXPAD

Start: 2000                      Length: 169

```

44 0230:AD B3 FB C9 06 D0 38 AD
8C 0238:C0 FB C9 E0 D0 31 AD BF
30 0240:FB D0 2C 38 20 1F FE B0
E0 0248:26 A9 FF 85 00 A2 00 BD
A7 0250:7F 02 9D 00 02 F0 03 E8
A5 0258:80 F5 20 77 A6 90 03 4C
94 0260:09 BE A2 00 BD 89 02 F0
CC 0268:15 20 ED FD E8 80 F5 A2
19 0270:00 86 00 BD D5 02 F0 06
A8 0278:20 ED FD E8 D0 F5 60 49
91 0280:4E 23 41 24 33 30 30 0D
A7 0288:00 C8 E5 F8 D0 E1 E4 A0
BE 0290:E8 E1 F3 A0 E2 E5 EE
C0 0298:A0 E9 EE F3 F4 E1 EC EC
65 02A0:E5 E4 AE 8D 8D C4 E9 F3
0C 02A8:E3 EF EE EE E5 E3 F4 A0
8F 02B0:F7 E9 F4 E8 A0 C9 CE A3
F7 02B8:B0 8D 8D D2 E5 E3 EF EE
43 02C0:EE E5 E3 F4 A0 F7 E9 F4
76 02C8:E8 A0 C9 CE A3 C1 A4 B3
23 02D0:B0 B0 8D 8D 00 C8 C5 D8
B5 02D8:D0 C1 C4 A0 D2 C5 D1 D5
03 02E0:C9 D2 C5 D3 A0 C1 CE A0
F5 02E8:C1 D0 D0 CC C5 A0 C9 C9
29 02F0:C7 D3 AE 8D 00 00 00 00
06 02F8:00 00 00 00 00 00 00 00
DB 0300:D8 20 8B 03 DA 48 AE 98
07 0308:03 AD 25 C0 29 10 D0 22
C9 0310:AD 25 C0 30 03 68 FA 60
83 0318:68 48 29 DF A2 00 C9 CE
0E 0320:F0 42 E8 C9 C8 F0 3D E8
89 0328:C9 C4 F0 38 C9 C3 F0 3D
14 0330:80 E3 8A F0 E0 C9 02 D0
FF 0338:03 68 80 3C A0 00 68 C9
44 0340:98 F0 35 C8 C9 BD F0 30
36 0348:C8 C9 AF F0 2B C8 C9 AA
5A 0350:F0 26 C8 C9 AB F0 21 C8
90 0358:C9 AD F0 1C C9 AE D0 0A
B0 0360:A9 A0 80 06 8E 98 03 68
A4 0368:A9 98 48 80 A8 20 8B 03
01 0370:8D 7D 03 68 A9 98 80 F2
06 0378:CA F0 09 E8 C9 AD D0 EA
EB 0380:A9 AC 80 E6 E8 98 18 69
CE 0388:C1 80 DF AC 31 BE C0 C3
30 0390:D0 03 4C 05 C3 4C 1B FD
D3 0398:00

```

TOTAL: 4EA9

END OF LISTING 2

# PROGRAMS FROM RECENT ISSUES

*Nibble* software is inexpensive and easy to use. Each disk contains the major programs from the magazine issue noted. You'll learn a lot about your Apple II and have fun doing it. To place your order:

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■ **MAY 1990 DISK** — Directory Designer/Print Shop Graphic Browser/HyperRes Plus... Volume 11, Issue #5.

Order No.: **W31**... Introductory price of \$12.95 expires 7/31/90. (New price will be \$16.95.)

■ **APRIL 1990 DISK** — Sound Wizard/Solving Simultaneous Equations/ProDOS Linker... Volume 11, Issue #4.

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For a 90-day period following the publication of each issue, *Nibble* offers the major programs from that issue on disk at nominal "introductory prices." During the introduction period, products will be shipped without accompanying documentation under the assumption that the buyer has the issue in which the programs appeared. Following the introduction period, the programs will be accompanied by reprints of the *Nibble* articles that documented them.

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## MAY 1990 DISK

■ **Directory Designer** lets you arrange the filenames in any ProDOS directory to make life easier. You can group files by frequency of use, the program that created them, or any other criteria you desire.

■ **Print Shop Graphic Browser** shows you all the Print Shop graphics pictures on a disk. You can view four pictures at a time, and zoom through all the filenames to find the ones to view next.

■ **HyperRes Plus** doubles the resolution of the Apple II's Hi-Res screen. Refine your displays with a resolution of 560 dots across the screen. Simple commands are available from Applesoft.

Order No.: **W31**... Introductory price of \$12.95 expires 7/31/90. (New price will be \$16.95.)

## APRIL 1990 DISK

■ **Sound Wizard** lets you make beautiful sounds on your Apple II — or, if you prefer, you can take a walk through the wild side of buzzers and flying saucers. Powerful yet easy-to-use commands give you full control over your Apple's speaker.

■ **Solving Simultaneous Equations** crunches numbers galore. This AppleWorks template solves up to four algebraic simultaneous equations.

■ **ProDOS Linker** adds DOS 3.3 compatibility to ProDOS. You'll be able to catalog DOS 3.3 disks from ProDOS and, when you find the file you need, you can load it without using an external program.

Order No.: **W30**... Introductory price of \$12.95 expires 6/30/90. (New price will be \$16.95.)

## MARCH 1990 DISK

■ **ProDOS Disk Doctor** helps you cure ailing disks. You can examine the bytes on a disk in detail, and change any of them using hexadecimal or alphanumeric style. Works on all sizes of ProDOS devices.

■ **Bicycle Log** computes your average pedaling speed after you enter the facts about your latest bike trip. This AppleWorks spreadsheet shows your progress by the length of trips.

■ **Custom Bingo** prints out specialized bingo cards on any subject for which you supply the questions and answers. A great twist on the normal drill and practice.

Order No.: **W29**... Introductory price of \$12.95 expires 5/31/90. (New price will be \$16.95.)

## FEBRUARY 1990 DISK

■ **Real Estate Advisor** gives you the numbers you need to decide if you should continue renting or take the plunge into home ownership. It figures long- and short-term costs, loan payments, and tax benefits.

■ **Stranded** puts you on a desert island where the only other inhabitant is your worst enemy! Both of you have anti-matter bombs, and only one will survive.

■ **GS Alarm** will help you from missing important appointments while using Applesoft BASIC. Set the time and the message, and let your mind concentrate on your work instead of a clock.

Order No.: **W28**... Introductory price of \$12.95 expires 4/30/90. (New price will be \$16.95.)

## JANUARY 1990 DISK

■ **Line Manager** will spare you from the pain of renumbering Applesoft programs. This ampersand utility uses the auxiliary memory to carry out the process instantly; just enter the first line number of your program, the line-number

increment you prefer, and voila! Line Manager keeps your original program in memory until the new one is created. And if it encounters an error, it leaves your program untouched.

■ **Over the Rainbow** is a very special place. You can see a spectrum in the sky only under certain environmental, atmospheric, and physical conditions. This program, which simulates light rays passing through a drop of water, will help you learn when rainbows are most likely to occur.

■ **ASCII File Reader II** continues the exploration of GS/OS programming by Sandy Mossberg. Learn to create an application window, draw text within it, and dump the screen to the printer.

Order No.: **W27**...\$16.95 + shipping

## DECEMBER 1989 DISK

■ **Treasure Dive** will tantalize the daredevil in you. Chests full of loot lie beneath the waves, but you have to outsmart piranhas, sharks, and deadly ocean mines to reach them. This original, arcade-style game, written in assembly language, will surprise you with its rich sound effects, humorous graphics, and non-stop action. The program has multiple skill levels, and keeps a file of your 10 best scores.

■ **Free Space**, a New Desk Accessory for the IIGS, will see to it you never again play guessing games when saving a file. Just pull down the Apple menu, select Free Space, and you'll get an instant report containing the name of each volume (including RAM disks), its capacity, and unused space in kilobytes. Free Space is an assembly-language program, and uses macros to invoke IIGS toolbox routines.

■ **Ticket Kit** will put a nice touch on your next fund-raiser, whether it is a raffle, talent show, or car wash. Just enter the particulars — the event, place, date, time, and price — and this program will design and print as many tickets as you need on an ImageWriter printer. Ticket Kit works with other printers after a few easy modifications.

■ **Hex File Checker** is a machine-language lifesaver. Use it, and you'll no longer have to check machine-language programs byte by byte to find the typo that slipped by. Just enter the starting address of the program you want checked, and this utility will step through it eight bytes at a time so you can compare the code to the listing.

Order No.: **W26**...\$16.95 + shipping

## NOVEMBER 1989 DISK

■ **Nibble Assembler** is your best alternative to an expensive, commercial assembler. All you need to type in assembly-language programs and routines is this application, a ProDOS-based word processor, an Apple with 128K of memory or more, and a listing.

■ **Trinum**, a Hi-Res game for two or three players, will stretch your advance-strategy skills. You've heard of a love triangle; now play this logic triangle, based on the game TriNim, but intricate and challenging, a rival for Othello and other computer "board" games.

■ **Search Sampler** will show you the difference a binary search can make. Applesoft pro-

grams that employ linear searches on large data sets can creep along like cold syrup. This program generates random-number arrays, then uses them to demonstrate the greater efficiency of the binary search.

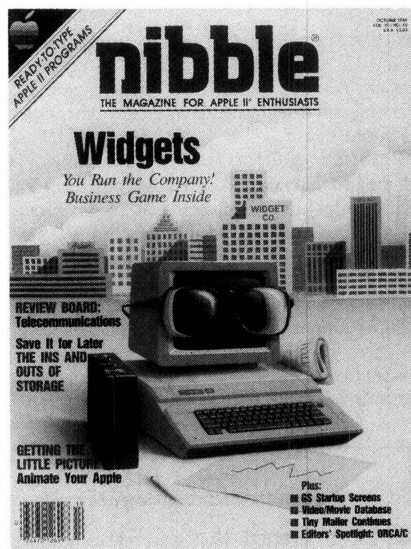
■ **ASCII File Reader** is Part 1 of Sandy Mossberg's exploration of a GS/OS Desktop application. This installment deals with the core elements shared by Desktop applications.

Order No.: **W25**...\$16.95 + shipping

## OCTOBER 1989 DISK

■ **Widgets** will challenge your business savvy. You're the president of the company, and your decisions about pricing, wages, advertising, research and development will determine its success or bankruptcy. Widgets combines the fun of a computer game with the lessons of running a small business. The result is an enlightening experience.

■ **GS Startup Screens** will soften the long delay. All you need are these two short programs, and a Super Hi-Res picture of your own creation or choosing. Once you've installed the art — a title screen, perhaps — you'll never have to worry about it again. Every time you boot the disk, your IIGS will display it automatically.



■ **Video/Movie Database** will help you find that certain videotape, even if you don't know its title. Search by actors/actresses, category, year, or director. Video/Movie Database is an AppleWorks application, so you need not be an expert programmer to build it.

■ **Getting the Little Picture** displays a colorful, flying rocket on the Hi-Res screen, but it is capable of much more. Use it to explore the world of Apple II graphics.

Order No.: **W24**...\$16.95 + shipping.

## SEPTEMBER 1989 DISK

■ **DB Construction Kit** simplifies the database creation process. No longer do you have to be a programming genius to build a database dedicated to your task, one that will work more quickly and efficiently than a general-purpose, commercial program.

■ **Wordsearch Wizard** makes building those brainteasers almost as fun as solving them. Just enter in the words you want to "hide," edit them as necessary, and press the Return key. Title the result, and a printout is just another keystroke away.

■ **Appleworks Gradesheet** can be a teacher's (next) best friend. It can manage student records according to name or test score. It can also help you monitor student progress, generate forms for grade entry, and keep track as students come and go.

Order No.: **W23**...\$16.95 + shipping

## AUGUST 1989 DISK

■ **Nibble Number Cruncher**, a powerful, stack-based calculator, performs everything from simple addition to complex statistical and trigonometric functions. Watch it send your work to the printer for an organized, uncluttered printout.

■ **PFX** takes the tedium out of handling ProDOS prefixes. Stop typing in those long pathnames and let this tool select the prefix with just a few keystrokes. It can be used from immediate and deferred modes.

■ **Mr. Clean** makes dirty disk drives a distant memory. Use the simple installer to add the CLEAN command to ProDOS. Insert your cleaning diskette, type CLEAN and presto! No more endless CATALOGing.

Order No.: **W22**...\$16.95 + shipping.

## JULY 1989 DISK

■ **Nibble MenuPro** gives you total control of all your files and directories, enabling you to exercise standard commands from one menu.

■ **Magic Squares** adds a little spark to a mysterious mathematical configuration. Create huge, odd squares with a few simple commands, then use them for games and educational programming.

■ **SuperClock** lets you know the time and date, any time, accessible from any IIGS program.

■ **New Desk Accessories in the GS/OS Environment** explains the essentials of IIGS NDAs, with instructions on building your own System Devices NDA.

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**Browse through our Software Catalog and see how easy, fun and inexpensive buying software can be!**

Whether you want to organize your home finances, draw splashy graphics, play games, or improve your programming efficiency, you'll find a Nibble Software disk that meets your needs.

We offer practical software that works quickly and easily. And we offer it at a low price! Chances are, you won't find this value elsewhere.

Nibble diskettes are not copy-protected. They come with copies of the original articles that show not only how to use them, but also how they work. It's a great way to learn programming techniques for customizing or writing your own programs.

And because we understand that Apple users don't upgrade every year, all Nibble programs run on the II Plus, IIe, IIC, IIC Plus, and IIGS unless otherwise noted. Many programs are in DOS 3.3 format and can easily be converted to ProDOS. All disks are 5.25 inches unless otherwise noted.

Dear Nibble,  
One of the best features  
of your magazine is the  
Nibble Software section.  
The sheer volume of  
programs on a single disk  
for a ridiculously low price  
astounds me.  
How do you do it?

Sincerely,

R. Sweeney  
McFarland, WI

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for some easy shopping...**

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## PERSONAL FINANCE

### INVESTMENT ANALYST

■ **The Broker** tracks the performance of your investments and graphically depicts the results, showing the relative profitability of your activities. Easy data entry and a variety of report options make this one of our most popular financial programs for investment recordkeeping.

■ **Nibble Investment Adviser** calculates return on investment both before and after taxes and for various time periods. You can measure the "bottom line" performance of up to 96 different investments, keep track of dividends and other income.

■ **Stock Analyst** develops a history of individual stocks, updates and tracks their performance, then evaluates each investment or the entire portfolio — automatically. Determine the value, amount of return, and your profit or loss if you were to liquidate the portfolio today.

Order No. **F02** Investment Analyst . . . \$26.95

### SMALL BUSINESS TOOLS

■ **The Forms Shop** creates customized letterhead, business forms and stationery in a variety of typestyles. (Requires a printer.)

■ **AppleWorks Plot** adds a Hi-Res plotter to AppleWorks. Print out a graph of spreadsheet or database data, or save it to disk.

■ **AppleWorks Bar Charts** lets you create bar charts from AppleWorks data.

■ **Quick Calendar** prints a full year's calendar on one page.

Order No. **F07** Small Business Tools . . \$19.95

### SHOPPER

■ **Super Shopper** maintains a master list of up to 1,600 separate items and lets you print out custom shopping lists for each trip to the grocer. Organize items into categories by product type or according to the aisles in your favorite store. (Requires a printer.)

■ **Coupon** keeps track of money-saving grocery coupons, so you maximize your household budget. Coupon lets you organize your coupons, weed out expired ones, and search and sort the coupons you want to take to the supermarket.

■ **Recipe Box** lets you keep your favorite recipes on disk and easily retrieve, edit, display and print out copies for a friend. Planning



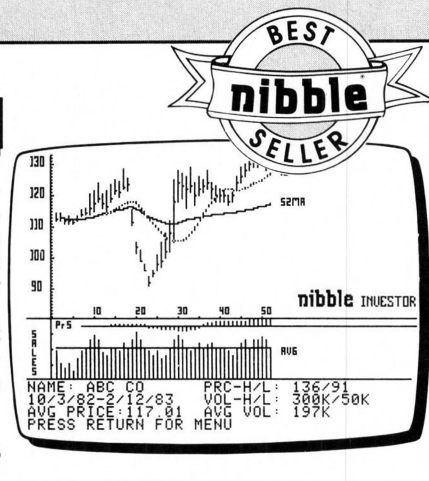
a party or dining alone? Recipe Box automatically determines the ingredient quantities needed for any number of guests. Your Apple can't do the

### PERSONAL INVESTOR

■ **The Investor** is a best-seller with five different reports including market, sales and yield analyses. Powerful Hi-Res graphs depict short-term and long-term price and market trends for each stock. Invaluable for deciding on sells/buys or for assembling information for tax reporting.

■ **Price File Editor** makes your investment analysis even more efficient. Records can be sorted, deleted or quickly added to the Investor's price files.

Order No. **F01** Personal Investor . . . \$29.95



### MANAGING MONEY

■ **Portfolio** turns your Apple into a personal stock analyst. It generates stock sell signals, tracks price updates, and records all your transactions. You can display up to four purchases of the same stock, track short sales, and review the last 10 turning points in a stock's price to compare the results of different investments.

■ **Financial Calculator** helps you make nuts-and-bolts financial decisions by instantly calculating interest on loans, future fund accounts, money markets, and scheduled deposit accounts. A valuable aid when you go shopping for loans or interest-producing investments. Requires a IIc, IIGS or an 80-column IIe.

■ **Investment Calculator** picks up where spreadsheets leave off. It calculates a variety of internal rates of return, net present value, and net future value of your investments. Find out which investments produce the best return for your cash investment.

Order No. **F08** Managing Money . . . \$19.95

### HOME FINANCE MANAGER

■ **TRAC** (Trend Reporting, Analysis and Control) monitors your credit card, check and cash expenditures. It prints more than 10 different

useful reports for analyzing your spending and managing your budget. Discover just where your money slips away — and start saving!

■ **TRAC Budget** is a flexible, fast budget preparation and reporting system. It allows you to easily prepare a personal budget, then prints reports that compare your budget to actual expenditures on an ongoing basis.

■ **TRAC Income** adds a third major module to the system. It generates monthly income statements and year-to-date reports.

■ **TRAC Graph** plots your personal finances in Hi-Res graphics for quick, visual analysis.

Order No. **F03** Home Finance Manager \$19.95

### MONEY SAVERS

■ **Nibble Banker** records and codes checking transactions, helps balance your checkbook and prints out expense reports for the categories you specify.

■ **Nibble Decisionmaker** evaluates alternative buying decisions down to the penny. So you spend your money more wisely.

■ **Loan Payback** instantly calculates the monthly payments on a loan for various principal amounts and interest rates. Requires IIc or IIe with auxiliary 80-column card.

Order No. **F06** Money Savers . . . \$24.95

cooking for you, but it will save you a lot of time in the kitchen.

Order No. **H01** Shopper . . . \$22.95

NEW!

### NIBBLEWRITER

■ **NibbleWriter** is an easy-to-use 40-column word processor. It is screen oriented and includes a full function word wrap, insert and delete functions, and many more useful features.

■ **PrintWorks** lets you use proportional printing in multiple fonts on your Hi-Res screen. Dress up your AppleSoft programs with fancy output. A font editor is included so you can create your own proportional fonts.

■ **Print Studio** enhances your ImageWriter by letting you create your own custom characters. You can include not only letters and numbers but also special symbols, and mix your new font with the ImageWriter's built-in fonts.

Order No. H14 NibbleWriter . . . . . \$19.95

## CAR AND TRAVEL PACK

■ **Gas Miser** is a thrifty program that tracks gas consumption for selected time intervals or for an entire year, and then plots the results in Hi-Res graphics. Even better, Gas Miser can be easily modified to measure your use of electricity, food or any other household expense. (Requires a printer.)

■ **Apple Highways** finds the best route for your next road trip. It can plan your route, list intermediate cities and highway numbers, and then automatically calculate the mileage for each leg of the journey. You can add to the 170 major US cities included on the disk. Get ready to go!

■ **Nibble Garage** makes preventive maintenance a snap! You just need your owner's manual, and some idea of the date and odometer reading each time your car is serviced. Then relax and let Nibble Garage generate the repair reminders that keep your car running smoothly.

■ **Expense Calc** gives you a quick and accurate picture of your business travel expenditures. This easy-to-use spreadsheet program neatly formats and prints weekly expenses. It can be easily adapted for personal as well as business expenditures.

Order No. H06 Car and Travel Pack . \$22.95

NEW!

## NIBBLE HOME OFFICE

■ **QuickWriter** emulates an electronic typewriter, for those small typing jobs that should be finished before your word processor finishes loading. This full-featured program allows you to save your work, too.

■ **NibbleCalc** offers you a powerful beginner's spreadsheet. Now it's easy to calculate your budget or to work out your taxes!

■ **Poster Creator** allows you to turn your Hi-Res and Double Hi-Res art into huge posters. With it you can blow up your charts and graphics so they can be seen from across the room. A typical poster can consist of up to 12 sheets of 8.5-11-inch paper for a normal Hi-Res picture or 24 sheets for a Double Hi-Res creation.

■ **AppleWorks Automated Check Register** lets you organize your check spending wisely and thoroughly.

Order No. H13 Nibble Home Office . \$22.95

NEW!

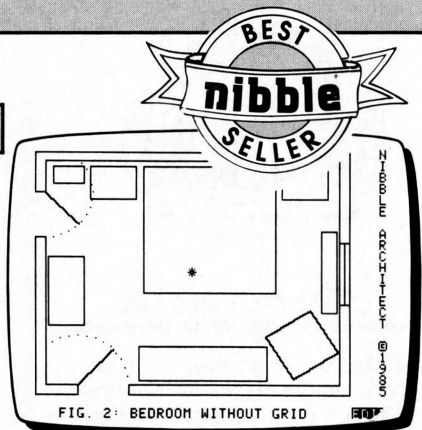
## HOME MANAGER

■ **Message Center** turns your Apple II into a household bulletin board. Improve communications in your busy home or office, and keep everyone up-to-date on important events. Display messages at certain times, or leave private messages to special people.

## HOME ARCHITECT

■ **Nibble Architect** uses the principles behind professional computer-aided design systems, to let you develop floor plans with ease and flexibility. Create, modify, and manipulate up to 50 items per room (including doors and windows) while maintaining accuracy to the nearest inch. Objects can be drawn to scale, and then moved, changed and duplicated — all in Hi-Res graphics that help you easily visualize different layouts. After planning your room design, print the layout and save it on disk for future reference!

■ **The Shape** allows you to create, view, edit and save graphics shape tables. Free-form shapes created in Lo-Res graphics are automatically translated into Hi-Res shape tables that can be used in any Applesoft or assembly



language program. Have fun jazzing up your own programs with your own graphics. Requires Apple II Plus and IIe only.

Order No. H07 Home Architect . . . . \$29.95

■ **Energy Squeezer** can help you take the heat off your utility bill. Discover how your home uses energy and learn where you can save. Spreadsheet-style data entry makes this program a snap to use.

■ **NibbleTerm** connects you to the Apple II on-line community. This telecommunications program works with your modem to hook you up to other Apples and network services too.

■ **Bill Keeper** helps you organize and chart all your monthly expenses. With this menu-driven household bookkeeper you can track expenses for up to 40 different accounts and add up monthly and yearly totals.

Order No. H16 Home Manager . . . . \$26.95

NEW!

## APPLEWORKS ASSISTANT

■ **Proof** allows you to examine what AppleWorks stores in each spreadsheet cell. This program is a valuable debugging and documentation tool for your AppleWorks spreadsheet files.

■ **Works Processor** quickly creates text files from your AppleWorks word processing documents, with or without carriage returns.

■ **ChartWorks** is an AppleWorks graphics utility that allows you to display and graph your spreadsheet files. You can read in files, display them, designate rows and columns of the spreadsheet as arrays, and graph that data in a number of different ways.

■ **NewsMaker** takes text files from AppleWorks or any other word processor and prints them out in two columns. Reduce pasteup chores when using The Newsroom or Print Shop by preformatting your work.

Order No. H15 AppleWorks Assistant \$22.95

## FREE TIME

■ **Garden Planner** is a fantastic graphics program for designing your garden row-by-row, calculating costs, and projecting the harvest from

your efforts. Shift and change your garden layout until it's just right — a planting guide tells you everything you need to know about 45 common vegetables.

■ **Outliner** is a valuable idea processor that helps organize your thoughts in an outline format. It features pull down menus and cut-and-paste editing. Great for planning your time, outlining projects, writing reports, and anything else you can think of.

■ **Tape Library** solves the mystery of what's where in your audio or video tape library. This handy database keeps track of what you've recorded so you can quickly find selections, or find the open space for recording that favorite show that's on tonight.

■ **Jogger** is like having a coach-in-residence. It tracks your daily running progress and puts monthly mileage goals within your reach. It can be easily modified for other sports like swimming and bicycling. Jogger lets you spend less time tracking your sport and more time doing it.

Order No. H12 Free Time . . . . . \$22.95

## MAIL MANAGER

■ **AIM (Automated Intelligent Mailing)** manages your mailings with ease. Because AIM lets you define up to 32 fields of information in each record, you can customize your lists to include exactly the information you need. After defining the format, you can display the data, make any changes, delete, find, sort, and print the labels. An "assembling" feature even lets you select the fields you want to print out on the label.

■ **Postmaster** lets you create records for up to 100 labels, save them on disk, then print them out in a variety of styles. Postmaster is especially handy for any situation where you want to file and print a variety of freely formatted labels. Printing mailing labels has never been easier! (Requires a printer.)

Order No. H05 Mail Manager . . . . . \$22.95



(continued)

## CALENDAR LIBRARY

■ **Nibble Desk Calendar** is a quick-reference desk calendar that lets you highlight dates and print out a list of the corresponding events. Menu bar selection makes entering, changing or deleting events a snap!

■ **Personal Appointment Calendar** keeps track of a year's worth of appointments with fast editing and printing.

■ **Quick Calendar** prints a full year's calendar on a single page. You'll never need to buy a calendar again!

Order No. **H08** Calendar Library . . . **\$16.95**

## DIETER

■ **Diner** is a personal diet planner that not only provides you with a nutritional analysis of foods and entire recipes, but also helps you keep track of your eating habits. The disk includes a database of over 400 foods, showing vitamin, mineral,

protein, cholesterol, fat and calorie content. Now you can customize your menu planning to match your body type, and develop both long-term and short-term diet planning. Users have told us that Diner out-performs other similar programs costing many times its price.

■ **Calorie Counter** tallies your calorie consumption with the calorie contents of the foods you eat. You assign calorie data to breakfast, lunch, dinner or snack categories and an automatic warning is flashed when you go over your daily limit!

■ **Fat Graph** tracks your dieting progress by

plotting weight changes in glowing Hi-Res color. Just enter your weight every day; Fat Graph will plot it over time (for up to 120 days), and display your progress.

■ **Recipe Box** makes cooking simple by keeping your favorite recipes on disk. Planning a party or dining alone? Use Recipe Box to automatically determine the ingredient quantities needed for any number of guests. You can even include notes to remember which recipes were hits!

Order No. **H02** Dieter . . . . . **\$26.95**

## SOUND MAKER

■ **Sound Synthesizer** creates sounds ranging from a complete musical score to explosions, machine guns and even bird calls. This sound creation utility lets you "draw" your sound effects on the screen in Hi-Res graphics. All sound effects can be saved on disk and replayed with a single command or stored in libraries for later use in your own Applesoft or machine language programs.

■ **Nibble Duet** jazzes up your programs with synthesized two-voice sounds. Create sophisticated sound effects to complement your visual effects. A demonstration program shows you how to vary them and add sounds to your programs.

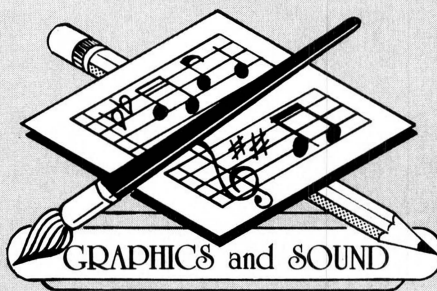
■ **Apple Talker** turns your Apple into a digital recorder. Sounds and words prerecorded on tape are played into the Apple via the cassette input, sampled and stored in memory and on disk. You can add speech to your programs without purchasing any expensive hardware. (Not compatible with the IIc or IIGS.)

■ **Beep Customizer** lets you modify your Apple's beep and includes the changes in other DOS 3.3 programs.

Order No. **S02** Sound Maker . . . . . **\$19.95**

## MUSIC MAKER

If you've tried incorporating music into your programs, spent hours fiddling with POKes and



CALLS, and still haven't gotten the musical notes you want, then try Music Maker — before you break your baton.

■ **Tunes** is an easy-to-use music system designed for quickly entering any tune into your Applesoft program. Play any note in a four octave range, with a duration as short as a quick click or as long as six continuous minutes! With a little extra effort, you can create songs and snazzy sound effects. Sharps, flats, duration, staccato, pauses, and all of the other piano/organ effects are there at your fingertips.

■ **Nibble Maestro** transforms your Apple keyboard into a four-octave organ. As you touch the keys, your Apple plays the corresponding notes and they simultaneously appear in the staff on the screen. Songs may be stored on disk where they can be edited or replayed. Use all 49 notes to compose tunes with Nibble Maestro.

■ **Little Organ Apple** is a Hi-Res representation of a two-octave organ keyboard that you can really play! This instrument can be used by

anyone for entertainment, by musicians for experimentation, and by students for practice.

■ **Happy Birthday** plays the "Happy Birthday" song and displays the words complete with the birthday person's name. Perfect for your youngster's next birthday.

■ **Guitar Chord Tutor** draws the first six frets of a guitar, and then uses Lo-Res graphics to overlay the proper finger placement. All basic major, minor and seventh chords are available. There's even a special feature that lets you measure your progress.

Order No. **S01** Music Maker . . . . . **\$22.95**

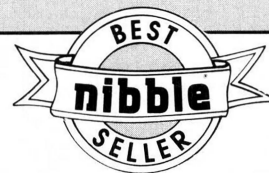
## GRAPHIC LIBRARIAN

■ **Shape Librarian** lets you more easily work with Hi-Res shapes. This powerful utility helps you combine tables, delete shapes, insert shapes, and more.

■ **Getting the Big Picture** compresses Hi-Res graphics to 25 to 50 percent of the space required by normal pictures. Whether you're designing graphics for an arcade game or for business presentation software, you will find this program invaluable.

■ **Mousetrap** takes your Hi-Res graphic and stores it in Print Shop format. Use the mouse or keyboard to capture any part of the Hi-Res screen.

Order No. **A12** Graphic Librarian . . . **\$18.95**



## DATABASE LIBRARY

■ **Executive Card File** puts an electronic index card file at your fingertips. You'll get tremendous flexibility with easy data entry and editing, speedy sorting and disk-based storage. Data can be entered and organized in virtually any manner. Each "card file" may contain up to seven sections and as many as 35 index cards can be stored in each section. Each card can hold nearly 500 characters. Once filed, index cards can be displayed, edited, sorted, removed or printed to a printer.

■ **Nibble File Cabinet** can be used to keep track of household or business information such as names and addresses, home inventory and everything else. Information stored in your File

Cabinet can easily be modified, rearranged or displayed. Nibble File Cabinet includes variable length records with key sorts and binary tree data storage. A Nibble best-seller!

■ **Applesoft Record Command System (ARC)** is a comprehensive information management program. Features include advanced data filing, editing, printing and telephone dialing. Search records, merge files and send data to your printer. And since your entire data set is stored in memory, ARC is fast.

Order No. **H10** Database Library . . **\$24.95**

## GRAPHICS PROGRAMMER

■ **Hi-Res Houdini** performs Hi-Res magic on your Applesoft or assembly language programs. Use machine language utility to create special graphic effects: scrolling and shifting images, changing shape colors, inverting Hi-Res colors, and merging, copying and swapping pictures on both screens. The graphics are amazing, and it's magically easy to use.

■ **Hi-Res Fill-Reverse** adds pizzazz to your Hi-Res graphic displays. Specify any rectangle and fill it with the color you select. Then use Reverse to create an explosion or produce other spectacular effects.

■ **Graphics Toolbox** is all you need to create dynamic animations. You'll have fun watching the effects produced by switching Hi-Res pages, inverting the images, and superimposing the page 2 image on page 1. A super tool for creating special effects.

■ **Amper DHR** taps your Apple's Double Hi-Res capabilities so you can produce sharper, more realistic graphics. Use special commands in your Applesoft programs to simulate normal Hi-Res commands. You get twice the normal horizontal graphics resolution on your Apple. (Requires at least 128K of RAM; not compatible with the Apple II Plus.)

■ **Eye Openers** makes a dramatic transition from one Hi-Res picture to another with an opening iris effect. An ever-widening hole appears in the center of the old image, revealing the new image. Add excitement to your own Applesoft graphics shows!

Order No. **A05** Graphics Programmer \$18.95

## PRESENTATION LIBRARY

■ **Chart Manager** transforms numeric data into sophisticated graphics. This versatile program performs basic statistical analyses, sorts and edits data, produces linear regressions, and then transforms the data into Hi-Res scatter plots, pie charts and bar graphs. Perfect for sales analyses and forecasting, personal finance evaluations, and investment analysis!

■ **Banner Boss** creates custom, eye-catching banners for parties, promotions — or any special occasion. Messages can be up to 255 characters long, written in letters two or five inches high, with underlining and emphasized print to add a personal touch. Say it with banners! (Requires a printer.)

■ **Color Billboard** turns your Apple into a dynamic electronic billboard for displaying attention-getting messages in 15 different colors. Features include smooth, fast text scrolling and colored blinking lights. Great for leaving messages for the family, or for math or language flashcards in school, or for advertising messages in your store.

■ **Solid State Slide Show** stores Hi-Res pictures and displays them with the speed of a slide show. You can store up to 18 different pictures to be used in your presentation. Use it for games or as an attention-getter in a store or trade show. (Requires at least 64K of RAM.)

Order No. **A04** Presentation Library \$19.95

## WINDOWWORKS

■ **WindoWorks** produces up to 50 dazzling animated windows with seven different types of animation that include: four-way scrolling, flashing regions, changing colors, and flashing window frames. Make text flash, curve, and dash across the screen for great displays.

■ **Ultra Fast Plx** saves and loads Hi-Res screens at lightning speed. You can scan and display 17 pictures on disk in less than 10 seconds. Snazzy promotional tool. Requires II Plus, IIc, IIfx and a 5.25-inch disk drive.

■ **Text Sculpture** turns ordinary text into almost any shape you can fit on the printed page — with a standard printer. Draw profile faces, decorative designs, and anything you can imagine.

■ **Wipeouts** gives you 10 novel ways to clear screens: top-to-bottom, bottom-to-top, left-to-right, right-to-left, or even fan outs from the center of the screen.

Order No. **A09** WindoWorks \$19.95

## DESIGNER/ILLUSTRATOR

■ **Designer and Illustrator** let you create complex graphics for gardening/landscaping, title displays, games development, or circuit/pipe layouts the easy way! Use the Illustrator to create graphics shapes; use the Designer to combine the shapes in your graphics library to build complex, professional displays. You can scale, color, edit, rotate and even redraw your shapes in "medium resolution" graphics. Make things look the way you want them to look — and have fun doing it too!

■ **The Shape** takes advantage of the Apple's powerful graphics capability. It allows you to create, view, edit and save shape tables. The free-form shapes created in Lo-Res graphics are automatically translated into Hi-Res shape tables. Have fun jazzing up your own programs with graphics that you design.

Order No. **A02** Designer/Illustrator \$19.95

## TURTLE LIBRARY

■ **Turtle BASIC** adds turtle graphics commands to Applesoft. You use 24 special key-words to direct the "turtle" around the screen, print Hi-Res text, create animation and more. Turtle BASIC is fast. But watch out! Once your children learn the turtle, they may leave you in the dust.

■ **Apple Turtle Graphics** lets you use simple commands to move and turn the turtle, as it draws pictures on the screen. Turtle Graphics is an excellent tool for learning simple programming concepts, conceptualizing math concepts and geometry, or just creating nifty pictures.

■ **Turtle Tutor** is a demonstration library that shows you how to design your own pictures, combine them... even create 3-D effects.

Order No. **A01** Turtle Library \$22.95

## ARTIST

■ **Apple Paint Box** is an electronic coloring book that combines the features of an Etch-A-Sketch, Spiro-Graph and a function-driven drawing board. Once you've drawn your shape, you can fill it with a flood of color.

■ **PAGE (Programmer's Aid for Graphics Entry)** lets you draw Hi-Res graphics, and then save them to disk as screen images or as program lines to include with your favorite Applesoft program. It also features a Help screen and options to draw, erase and change colors. At last! An alternative to shape tables.

■ **Art Gallery** is a Hi-Res video show of 33 different art forms, some accompanied by sound. Each art form has multiple variations and provides hours of entertainment. Just sit back and enjoy it.

■ **Hi-Res Shapemaker** is an easy-to-use program that enables you to draw boxes, lines or shapes, fill them in, and then frame the pictures. When it's finished, your masterpiece can be saved on disk.

■ **DHR Palette** lets you design Double Hi-Res graphics in black-and-white or color, and save the entire screen to disk for future fun. (Requires at least 128K of RAM; compatible with the unenhanced IIfx only.)

Order No. **A03** Artist \$18.95

NEW!

## ART DIRECTOR

■ **Transformer** stretches the capabilities of your Hi-Res screen! Twist, stretch, and shrink any portion of the screen.

■ **Snapshot** prints out Hi-Res pictures vertically or horizontally on your ImageWriter.

■ **SpeedDraw** is an Applesoft tool that lets you create smooth curves and sharp angles on your Hi-Res screen. It takes care of all the trigonometry for you and all you have to do is learn SpeedDraw's ampersand commands.

■ **Fractal Trees** shows you how fractals, the exciting combination of mathematics and graphics, create the shape of nature. You can set up normal-looking fractal trees, or go for the alien and the bizarre!

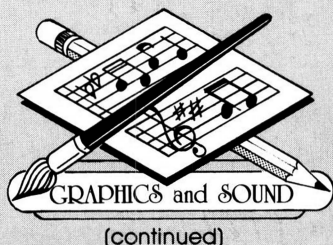
Order No. **A11** Art Director \$19.95

## SIGHT AND SOUND

■ **AmperPalette** is a powerful library of 22 ampersand commands that produce Double Hi-Res graphics in Applesoft. Use the special double-resolution 16-color mode or your IIfx, IIc or IIGS, and even add music to your programs.

■ **Arcade Sound Editor** adds Zaps, Booms, and Kapowee's to your programs for real arcade excitement. This two-pitch sound creator produces a wide range of interesting and dramatic effects. Requires a II Plus or a IIfx.

■ **HPlot GS** lets you create super Hi-Res graphics in 16 colors which can be changed to any of the 4096 colors available on the Apple IIGS. Define colors by specifying the red, green, blue concentration and then draw, plot and paint to your heart's content.



(continued)

■ **Hi-Res Tricks** adds 15 more routines to your graphics library for scrolling, mirror imaging, flipping, or even producing upside-down graphics screens. This utility gives your programs extra visual punch and it's a cinch to use.

Order No. **A10** Sight and Sound . . . \$19.95

## FONT FOUNDRY

■ **The Font Foundry** is a character generator and editor that you can use to design one-of-a-kind Hi-Res character sets. Make your documents print shop perfect!

■ **Double Hi-Res Characters** prints legends and captions in a variety of special character sets, including DOS Tool Kit format characters.

■ **Print Shop Utility** lets you capture an area from the Hi-Res screen and import it into Print Shop.

■ **Font Blaster** makes your Apple print like a Mac. It lets you use dozens of Tool Kit typefaces or create custom characters for the ImageWriter and Prowriter.

Order No. **A08** Font Foundry . . . \$22.95

NEW!

## IIGS GRAPHICS ASSISTANT

■ **Supergraphics GS** gives you the power to create stunning Super Hi-Res displays from BASIC. The 15 ampersand commands control the graphics screen from within your own Applesoft programs. Complete palette control lets you achieve dazzling effects.

■ **Super Hi-Res Picture Packer** compresses

and displays your collection of Apple IIGS Super Hi-Res Graphics. Store an art gallery on disk with the space this handy utility will save. You can also pack and unpack selected rectangular portions of the screen, to animate your own graphics!

■ **The Graphics Switcher** converts Super Hi-Res graphics to standard Hi-Res graphics. Enjoy IIGS art on any Apple II.

■ **GS/FX** provides you with three stunning new ways to look at graphics on the IIGS. You can present a black screen and watch your picture load in color by color. You can also fade your picture out to black or "fold down" the screen, color by color.

■ **Super Hi-Res Graphics Converter** brings all of your Hi-Res artwork to the Apple IIGS graphics screen, with many options for the type of display.

Note: 3.5-inch disk only.

Order No. **A13** IIGS Graphics Assistant \$29.95



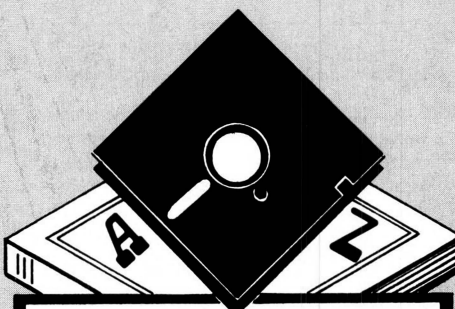
## CLASSROOM MANAGER

■ **Nibble Grade Book** gets high grades from teachers! It easily tracks and analyzes test scores, then calculates and prints the grades for up to 10 classes of 80 students each. This versatile program lets you store test grades and test descriptions, calculate cumulative grade points and percentage grades for each student. You can assign letter grades and determine the mean grade and standard deviation of a test. You can even drop the lowest test grades and adjust test scores for the entire class. An indispensable tool for all teachers!

■ **Personal Appointment Calendar** keeps track of up to 15 memos per day for a year's worth of appointments. And if you like to see everything in writing, just select and print out the appointments you need for quick reference.

■ **Executive Card File** puts an electronic index card file at your fingertips. You'll get tremendous flexibility with easy data entry and editing, speedy sorting and disk-based storage. Data can be entered and organized in virtually any manner. Each "card file" may contain up to seven sections and as many as 35 index cards can be stored in each section. Each card can hold nearly 500 characters. Once filed, index cards can be displayed, edited, sorted, removed or printed to a printer.

Order No. **E01** Classroom Manager \$26.95



## Home/School Education

### IT'S FUN TO LEARN

■ **Shark** is a graphics math game your kids will love. Save the fish from being gobbled up by solving math problems and get bonus points for speed. But expect problems to get more difficult as the game progresses. That's the challenge and the fun.

■ **Spelling Maze** takes a no-fail approach to teaching children to spell. Move the player through the graphic maze picking up letter-keys in the correct order to open the exit and escape. Music rewards your child's progress.

■ **Learn the USA** uses map graphics to help teach the location and capital of each of the 48 contiguous states. It tracks incorrect answers so you can measure your progress with each play.

■ **Keyboard Tutor** uses an on-screen graphics keyboard to provide home key instruction, key/finger drills, and accuracy tests for typing. It also includes an on-screen help and fast animation of finger-to-key visual aids. Outstanding typing aid.

Order No. **E14** It's Fun to Learn . . . \$16.95



## SCIENCE AND FUN

■ **Nibble Planetarium** has many of the features of a real planetarium. This Hi-Res star charting system displays the sky from any location in the Northern Hemisphere at any time of the year. A special mode lets you view the night sky and see how it changes with the passing hours. A great learning tool for amateur astronomers! **Bonus:** Includes a special unpublished file that includes all the major constellations — over 600 stars!

■ **The Serpent's Coil** traces the destructive paths of the hurricanes as they snake through the Gulf of Mexico and the Caribbean on a collision course with the U.S. coast. Track hurricanes on the Hi-Res screen, and the plot, scale, and label them for printing. Plot data for new storms, or track eight historic hurricanes, such as the Great Galveston Storm of 1900, Camille (1969), and Alicia (1983), that are included on the disk.

■ **Direction Fields** displays the intricate patterns of direction fields in Hi-Res graphics using the mathematical function you supply. Wind directions, patterns of iron filings in a magnetic field, and air flow patterns are just some of the phenomena you can investigate. For fun, you can also create fascinating abstract patterns.

Order No. **E08** Science & Fun . . . \$29.95

## MATHEMAGICIAN

■ **Math Monster** makes scary fun out of math learning. Can your children solve the multiplication or division problem before the Math Monster gobbles them up? That's the challenge — and the fun. When your child wins, the Professor runs across the screen and whacks the monster soundly. But, if they don't learn those multiplication and division facts, watch out! The Math Monster will eat them up!

■ **Math Marathon** is a math practice program that drills your children in addition, subtraction, multiplication and division. Varying levels of difficulty will help keep your kids in the running for good grades in math tests!

■ **Apple Trig** plots your favorite trigonometric functions in Hi-Res graphics. Watch the graph being plotted, and then overprint graphs to make comparisons. Apple Trig lets you graph the sine, cosine, tangent, cotangent, secant and cosecant functions. A great learning tool for home or school.

■ **Mathemagician** makes solving word problems magically easy. Your children's wits and math skills are their weapons in this exciting adventure game. They'll love solving the mathematical word problems to unlock doors, discover hidden treasure and escape lethal perils. It's fun to build math skills!

■ **Math Concentration** puts a new twist on an old theme. To win, your child must uncover matching colored pictures and solve math problems. Math Concentration facilitates memorization and the development of basic math skills — the fun way.

Order No. **E05** Mathemagician . . . . \$22.95

## WORDS AND NUMBERS

■ **Flashcard** takes the drudgery out of math drill! Pace the speed of the drill to suit the learner: fast or slow, with one or two chances to give the correct answer. Flashcard plots a colored bar graph of successes and redisplay any problems that were missed. With Flashcard, kids can both enjoy using the Apple and learn their math tables.

■ **Universal Metric Converter** converts English and metric units with menu-driven ease. How many milliliters in a gallon? What's your weight in kilograms? Forget all those conversion factors, and let this program do the work for you!

■ **Trivia Master** never lets you run out of questions because it lets you make up your own. The quicker responses receive higher scores — if you're right. Because you can create and adjust the difficulty level of questions, Trivia Master can be challenging and entertaining for all ages. Trivia Master includes a file of 200 questions to get the party going.

■ **Word Find** lets you make your own hidden word puzzle mazes of any size up to 40 rows and 40 columns. Then print them out on your printer, with clues and a separate answer sheet. Fun for young and old. (Requires a printer.)

■ **Life** is a graphic version of the incredibly popular game of Life that was originally published in Scientific American. You set up a starting colony of cells and watch the birth, survival and

death patterns of the cells as generation after generation evolve, grow, migrate, move and behave in completely unpredictable patterns. A unique simulation.

■ **Binary Clock** is an amusing and unusual timepiece for the dedicated programmer. It displays an accurate machine language timepiece in Lo-Res graphics. Put aside your ordinary clock and view the current time as your Apple does — in 8-4-2-1 binary code!

Order No. **E04** Words and Numbers . \$19.95



## COMMANDER

■ **Nibble Beach Head** puts you in command. Destroy the enemy machine gun emplacement, while avoiding mortar attacks and machine gun fire. Each soldier is equipped with only a rifle and two grenades. However, the enemy has snipers, machine guns, mortar shells, barbed wire and mine fields. A must for war game and strategy fans.

■ **Tank Combat** simulates the deadly struggle of World War II tank combat. Strategy and foresight are the keys to winning, as you maneuver to defend your HQ, ammo dump and fuel depot against enemy fire. Use your six tanks wisely, or you won't survive the night.

■ **Artillery Duel** is a realistic artillery simulation with a twist of math. From opposite sides of a mountain, you shell your enemy's encampment. The best judge of fire power, barrel elevation, and a fickle wind will survive. This Hi-Res action will fascinate the math buffs.

■ **Atlantic Convoy** pits your navy against the enemy in an all-out struggle for the Atlantic. You need strategy and skill to maneuver your fleet of carriers, destroyers, submarines, and support vessels. Each type of vessel has unique attack, defense, and movement capabilities. Can you defeat the enemy before you run out of fuel or get sunk? Great entertainment on the Hi-Res seas!

Order No. **G05** Commander . . . . \$19.95

## GHOST GOBBLER

■ **The Nibbler** is the classic dot-gobbler: eat all of the dots in the maze while avoiding orange ghosts! Gobble the colored dots, munch on an energy cube for that extra boost of power, and keep progressing through mazes of increased difficulty. A feast of fun!

■ **Clam Bake** makes you the hapless, hungry

clam trapped in a kelp bed. To survive you must outmaneuver the deadly jellyfish, eat all the diatoms, and advance through the seaweed mazes. Four life-saving pearls are your only weapons. Clam Bake features stop/start options and optional sound effects.

■ **Speed Maze** challenges you to navigate a randomly generated maze as fast as you can. The wide range of selectable speeds makes the game fun for both novices and experienced players. And if you're a programmer, you'll find a fascinating algorithm for generating mazes.

Order No. **G10** Ghost Gobbler . . . . \$19.95

## ATTACK PACK

■ **Surprise Attack** is one of the best arcade games we've published. It pits your skill and three defensive missile bases against an incoming horde of ICBM's. Your objective: the survival of six cities under your protection. Provides hours of white-knuckle challenge.

■ **Major Mayhem** puts you on a planet ruled by spiders. It challenges you to traverse a web of alien cities and collect enough energy spheres to refuel your ship and escape. But watch out, the spiders are coming!

■ **Barricade** is a two-player game of luck and strategy. Use a giant claw to demolish a wall of colored blocks. Grab the high-scoring blocks to win, but beware of mystery blocks. They can mean big gains — or big losses.

■ **Starlaser** puts you at the helm of a fast, laser-equipped starship. Battle the Kloryon starbases before your fuel supplies are exhausted. Be careful though. The Kloryons are notorious for making end run attacks from behind the meteor belt.

Order No. **G17** Attack Pack . . . . \$18.95

## ELECTRIC ARCADE

■ **Formula Nibble** puts you behind the wheel of a Grand Prix race car taking the curves at top speed. Three super-realistic, full-color Hi-Res tracks simulate races on actual Grand Prix circuits. Start your engines!

■ **Voratio** is the hungry space worm. Guide it in search of food through your choice of 19 challenging levels.

■ **Othello and Seawolf** are two games: an ancient strategy game, and a simulation of torpedo warfare waged on the Hi-Res seas. (Requires paddles or joystick.)

Order No. **G14** Electric Arcade . . . . \$19.95

NEW!

## NIBBLE GAME ROOM

■ **Chinese Checkers** brings an adaptation of the classic strategy game to your Apple. Play against a tough computer opponent on a colorful Hi-Res game board. Can you outwit your Apple and get your marbles across the board first?

■ **Connection** is a game that challenges you to compete against your Apple for territory on the



## PRODOS LIBRARY 3

■ **Display** makes your ProDOS VAR files work for you! It looks into the VAR files on your disks, and lists the names and values of all real, integer and string variables in your Applesoft programs. An excellent tool for debugging; to efficiently initialize program variables; or to preserve the current state of a program while it carries out another task.

■ **Disk Librarian Pro** catalogs all your disks and instantly creates a quick-reference master list. Wondering which of a dozen disks holds the file you want now? Disk Librarian Pro has the answer! It reads and stores the catalog information, and records whether it's a DOS 3.3, Pro-DOS or Pascal disk. You can display, sort and print hundreds of file names. The master list can even be transferred into AppleWorks!

■ **Expanded ProDOS Catalog** displays all of the files on a ProDOS formatted disk — no matter how deeply they are buried in subdirectories. You can even start at a chosen subdirectory level and retrieve all of the file names below that level.

Order No. **Q05** ProDOS Library 3 \$26.95



## DISK FIXER

The right tools for fixing disk problems.

■ **Disk MAP System** is a road map to your DOS 3.3 disks, showing you the exact location of your files and how much space they occupy. You can display and verify every sector on the disk, or to display a list of sectors used by a particular file. Automatic sector verification lets you know if some sectors are damaged, indicating that repair is needed. Documentation includes hints for fixing damaged disks.

■ **Disk MAP II** uses a snapshot method to instantly display a complete map of the disk, includ-

ing all of the occupied and free sectors, on just one screen. The display includes a code to the names of the files, so you can see exactly where your files reside on the disk. You can send the map to the printer for closer study.

■ **Disk Zap** zooms in to directly read the contents of a disk sector and display it on the screen in hexadecimal and ASCII format. You can then review, edit and print out the sector's data, and "zap" the disk by writing the modified contents back onto the disk. Simple, one-key commands let you step backward and forward to view the next or previous sectors. Or Have fun by creating hidden file names, modifying DOS and more! Includes detailed instructions for repairing a variety of disk problems.

■ **Disk Doctor** finds the cure for sick disks. It recovers accidentally deleted files — automatically! There's also an option that lets you remove DOS from your disks, creating unbootable data disks that let you store an additional 32 sectors of information — over 8,000 bytes!

Order No. **D02** Disk Fixer ..... \$22.95



## DISK LIBRARIAN

A complete library of powerful disk utilities.

■ **Disk Librarian Pro** catalogs all your disks and instantly creates a quick-reference master list. Wondering which of a dozen disks holds the file you want now? Disk Librarian Pro has the answer! It reads and stores the catalog information, and records whether it's a DOS 3.3, Pro-DOS or Pascal disk. You can display, sort and print hundreds of file names. The master list can even be transferred into AppleWorks!

■ **Sector Stretcher** gives your data room to grow. It clears up to 45 extra sectors, stretching the capacity of every DOS 3.3 disk you own. Perfect for database users who've seen the DISK FULL error message much too often.

■ **RAM Disk II** ends the disk shuffle. It adds a 16K electronic RAM disk to your system. Now you can store frequently-used utilities on a RAM disk tucked inside Apple memory. You get faster access and all disk commands work the same as with your regular DOS 3.3 disks.

■ **Diskoverer** is a fast, powerful DOS 3.3 disk zap program. Use it to rescue your damaged disks or inspect file formats. A range of features let you read from, display and write to any sector, in any of three ASCII formats. Diskoverer lets you easily page through a file, then change data or disassemble any portion of a sector.

Order No. **D06** Disk Librarian . . . \$29.95



## Programming Productivity



## MACHINE LANGUAGE MASTER

Take the pain out of machine language!

■ **Machine Language Editor** makes entering and editing machine language programs as easy as using a word processor. If you make a mistake and leave out some code, Machine Language Editor lets you go back and insert the missing bytes. Or if you mistakenly insert extra characters, Machine Language Editor lets you delete them, and the rest of the program fills in the space. Imagine the time you'll save and the frustration you'll avoid. A must for your library.

■ **Hexpad** is another tool to minimize the tedium of entering lengthy machine language programs. A phantom keypad provides fast, easy entry of hexadecimal data by using 16 keys on the Apple keyboard. No more hunting and pecking through the top row of keys.

■ **ASCII.Dump** demonstrates the use of opcodes and pseudo-opcodes, and allows you to examine the Apple's memory. ASCII.Dump lets you stop, pause, restart and step through a hex dump at your own pace. It also prints the hexadecimal values of numbers stored in memory and their ASCII character equivalents.

■ **Hex Sequence Finder** makes fast searches for all occurrences of a one to fifteen-byte sequence of hexadecimal numbers in memory. Use this speedy utility to debug your machine language programs or find Applesoft and DOS commands. You specify the area of memory to be searched and Hex Sequence Finder will scan it — instantly!

Order No. **P02** ML Master . . . . . \$29.95

NEW!

## APPLESOFT TOOLBOX

■ **Applesoft MatchMaker** helps you track different versions of programs you're writing, and points out the differences to make sure you're up to date.

■ **Applesoft Page Lister** provides you with an easy way to print professional-looking Applesoft listings. It makes sure that your listings don't run over the page perforations and it adds a title and page number to each page.



## BASIC ASSEMBLER

### Machine language programming the easy way!

■ **BASIC Assembler** produces machine language programs quickly and easily. Machine language programs run much faster than their Applesoft counterparts, but writing them can be much more difficult. This 6502 assembler (written in Applesoft) and its companion source editor simplify the task of writing programs in assembly language. A great way to start dabbling in Assembly Language programming.

■ **BASIC Assembler Enhancements** adds professional features to the BASIC Assembler. Now you can have printouts of the assembled listing that look just like the ones produced by commercial assemblers. You can also add full-line comments and two new pseudo-ops: ASC and HEX. Modifications to the editor allow 80-column editing. (Requires an 80-column card.)

■ **BASIC Disassembler** translates machine language code into symbolic source code that your assembler can read. Use it with the BASIC Assembler or Apple's DOS Tool Kit to modify, correct or enhance programs for which you have no source code. There's also a provision that allows easy customization for use with other assemblers.

■ **Machine Code Editor** reduces the tedium and potential problems of typing large machine language programs from books and magazines. It checks the validity of your entry by comparing it to the original, and shows you a disassembly as you enter each line of code. And if your evening isn't long enough to enter the entire program, save it and continue another day.

Order No. **P08** BASIC Assembler . . \$26.95

## DOCUMENTOR

### Give your program listings that professional look.

■ **Navigator** makes program documentation a breeze! It's a BASIC listing utility and flow-chart formatter that reformats Applesoft listings and prints flowcharts complete with graphics symbols. Simplify the tasks of modifying programs and checking the logic by producing top-notch documentation with Navigator. (Requires a printer.)

■ **Pretty Lister** gives new character and clarity to your listings. It formats and indents your multi-statement lines so they print with that structured programming look. Indentation of FOR NEXT loops and IF THEN blocks helps you see the logic structure of Applesoft programs and make programs easier to read. (Requires a printer.)

■ **AMPOS** gives you a quick and easy way to position the cursor and print on both the 40-column and 80-column screens. This three-parameter ampersand command also fixes a bug in some IIe 80-column cards. Stop worrying about cursor control — let one simple statement handle it all for you.

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Order No.: **P15** Applesoft Toolbox . . \$22.95

## APPLESOFT STREAMLINER

### Pare program execution time to the core!

■ **Applesoft Execution Monitor (AEM)** optimizes the performance of your Applesoft programs where they need it most. Inefficient routines can slow down your programs — even ones that appear well-structured. AEM spots the program statements that are executed most often, and prints a chart showing the relative execution frequency of each line. A powerful tool for optimizing Applesoft programs. (Requires an 80-column card and 64K of RAM.)

■ **Applesoft Line Cruncher** goes to work on your program to save memory and increase speed. This utility automatically compresses multiple Applesoft program lines, joining them wherever possible, to create compact multi-statement lines. When two lines are combined, and the savings in memory really adds up!

■ **Applesoft Anti-Line Cruncher** expands multi-statement Applesoft programs so that you can see each statement on its own line. To save time and space, "Crunch" your program; but to maintain a program with individual lines for easy readability, use the Anti-Line Cruncher.

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■ **Applesoft Variable Cruncher** compresses long variable names to one or two letters, saving bytes of memory and dramatically increasing execution speed. Even better, you get the benefits of a shortened program without having to do any tedious manual editing.

Order No. **P04** Applesoft Streamliner \$22.95

■ **List Master** prints a formatted listing of your Applesoft programs that highlights REM statements, indents FOR NEXT loops and IF THEN statements, and separates each command on a separate line. (Requires a printer.)

■ **Compare Applesoft** lets you automatically compare different versions of your programs for changes, additions and deletions. Use it when you modify programs and want to share your enhancements with others. This is an absolute MUST for keeping track of revisions in programs that are continually being updated.

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## BUDGET TRACKS

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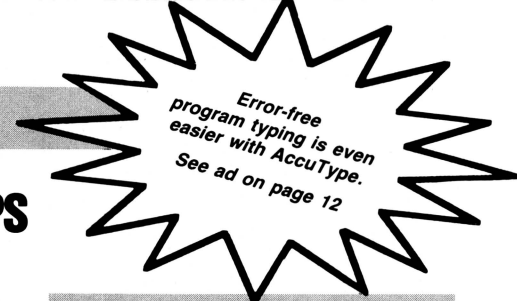
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Order No: **F04** Asset Manager . . . . . \$14.95

## TYPING NIBBLE LISTINGS IN FOUR EASY STEPS



There are four main steps to typing in a program:

1. Create a work disk.
2. Type in and save the CHECKIT program.
3. Type in the listing with CHECKIT installed.
4. Save the program to disk.

### STEP 1: CREATING A WORK DISK

Most *Nibble* programs work with either DOS 3.3 or ProDOS. If you have one particular program in mind, check the article for operating system compatibility.

If you are using ProDOS, copy the files PRODOS and BASIC.SYSTEM from a ProDOS master disk or from your System Utilities disk to a newly formatted disk. Apple IIGS owners should copy the file P8 from the subdirectory /SYSTEM.DISK/ SYSTEM and rename it PRODOS in addition to copying BASIC.SYSTEM.

If you choose DOS 3.3 as your operating system, first boot your DOS 3.3 system master disk, then remove the disk from the drive and follow these steps:

1. Type NEW and press Return.
2. Type 10 HOME and press Return.
3. Insert a blank disk into the disk drive, type INIT HELLO and press Return.

### STEP 2: TYPING IN CHECKIT

You're ready to type in the CHECKIT program shown on the following page. But before you type any program, clear the Apple's memory by typing NEW followed by Return. Remember, computers are very picky about how programs are typed. Be sure to type the program exactly as it is listed, including punctuation and spacing. After you've typed the program, save it on disk with the command

SAVE CHECKIT

### STEP 3: USING CHECKIT TO ENTER A PROGRAM

CHECKIT watches your typing to see if you type a program line correctly. When you press Return at the end of a line, CHECKIT prints a number that will match the one published in the magazine if you've typed the line correctly. If the line is mistyped, the number printed won't match. CHECKIT runs only in the 40-column mode.

Once you've entered the CHECKIT program and saved it to disk, install it by typing

RUN CHECKIT

The first time you run CHECKIT, you may get the message "ERROR IN DATA STATEMENTS." If this occurs,

recheck the data statements at and before the line listed. Correct any errors and save CHECKIT to disk before running it again.

If there are no errors in CHECKIT you'll be given the option to choose whether you'll type an Applesoft or hexadecimal listing. Some articles have more than one listing and may contain both hex and Applesoft BASIC listings. You must RUN CHECKIT before typing in each separate listing. The article will describe the listings and identify them as either hex code or Applesoft BASIC code. The following two sections describe the process of entering an Applesoft BASIC listing and a hex listing.

### Applesoft Programs

If the listing you wish to enter is identified as Applesoft BASIC, answer N to CHECKIT's question "Are you entering a hexadecimal file?" and the Applesoft BASIC version of CHECKIT will be installed. Once it is installed, you may begin typing in the Applesoft BASIC listing. Applesoft BASIC lines listed in *Nibble* begin with a CHECKIT code, followed by a line number and the Applesoft commands. Do not type in the CHECKIT code! Type in the line number and all of the characters up to the next line number before pressing Return.

Be careful to maintain spacing between quotes. Also, avoid resetting the Apple II when CHECKIT is installed. You can omit the comments after REM statements, although they usually contain useful information when you're reading the listing.

Let's enter a sample Applesoft BASIC listing. Boot your work disk and run the CHECKIT program. Since you're not entering a hex program, answer N to the question asked and CHECKIT will be installed in your Apple. Now you're presented with an Applesoft BASIC prompt character and a flashing cursor. You're ready to begin typing the listing. To enter the program shown in Example 1, type

```
10 REM RING THE BELL
```

followed by a Return. The CHECKIT code for that line (37) will be printed if you've typed the line correctly. If the code doesn't match, type the line again, paying careful attention to detail. Now type lines 20 and 30. After you've typed in the entire program, enter Control-Z (hold down the Control key and press Z) for the final check code. If the code you get doesn't match the printed code, you've probably skipped a line or have an extra line in your program.

### EXAMPLE 1: BASIC.PROGRAM

```
37 10 REM RING THE BELL
54 20 FOR J = 1 TO 5: PRINT
    CHR$(7): NEXT J
91 30 END

TOTAL: 1CB9
```

### Hex Programs

If the listing you wish to enter is identified as hex code, answer Y to the question asked by CHECKIT and the program will ask two other questions. It asks, "What is the starting address of the file?" and "What is the length of the file?" These numbers will be included at the top of the hex listings. Be sure the Caps Lock key is down when answering these questions and when entering the program. You'll have to enter the System Monitor with the command CALL -151. (The System Monitor is simply the part of your computer used for entering machine language.)

Machine language programs are published in a "hex dump" format. This means that an address is displayed followed by bytes stored in those addresses. The numbers may look unfamiliar because they are in hexadecimal (base 16) notation. For instance, in Example 2, the number stored in address 0300 is A2. In address 0301, the value 05 is stored.

To type in Example 2, you should boot your work disk and run CHECKIT. Answer Y to the first question asked. As you can see from the beginning of Example 2, the starting address is 0300 and the length is C. These numbers should be entered at the next input prompts. CHECKIT will be installed and you should see a System Monitor prompt. Now enter

```
0300:A2 05 20 DD FB CA F0 03
```

followed by a Return. The number 73 should be printed below your line. If it's not, retype the line. Now enter the second line in a similar fashion and press Control-Z for the final check code. Again, if this final number doesn't match, you've probably skipped a line in your typing.

### EXAMPLE 2: HEX.PROGRAM

```
START: 300                                LENGTH: C
73 0300:A2 05 20 DD FB CA F0 03
80 0308:4C 02 03 60

TOTAL: E52E
```

To check your typing by listing the program, first type the address you want to check and press Return. This will display the address and the byte entered at the address. To display a range of addresses, type the first address you'd like to see, followed by a period and the last address. For example, to see addresses 0300 to 03A0, type

```
0300.03A0
```

followed by a Return.

**Special Note for IIGS owners:** When displaying an area of memory, an additional number followed by a slash (/) will appear before the address in your dis-

play. To the right of the eight bytes listed in the line, there will be eight additional characters displayed. These have no relationship to the numbers produced by CHECKIT and may be ignored.

#### STEP 4: SAVING THE PROGRAM ON DISK

You should save the program to your work disk periodically while entering the listing and after completing a program. Saving a program on disk is simply a matter of giving the correct command. This command is always given in the article accompanying the program listings.

#### Technical Support

If you run into a problem with a *Nibble*

program that you can't solve, send your questions and a SASE to the Nibble Technical Support Department at 52 Domino Dr., Concord, MA 01742. Phone support is available on the Tech Support line from Monday through Friday between 2 and 5 PM EST at (508) 371-1669.

#### Nibble Hotline

If you have a 300- or 1200-baud modem, you can reach our Nibble Hotline at (508) 369-8920. The latest errata are listed, and you can download one-liners or order Nibble/Mindcraft software. The parameters are 8 data bits, 1 stop bit, no parity, full duplex.

#### LISTING 1: CHECKIT

```
10 REM *****
20 REM * CHECKIT, COPYRIGHT 1988 *
30 REM * BY MINDCRAFT PUBL. CORP. *
40 REM * CONCORD, MA 01742 *
50 REM *****
60 TEXT : HOME : NORMAL : PRINT "CHECKIT": PRINT
  "COPYRIGHT 1988 BY MINDCRAFT PUBL. CORP."
70 ONERR GOTO 90
80 FOR I = 0 TO 377: READ ML:CS = CS + ML: NEXT
  : RESTORE : IF CS = 48127 THEN 100
90 PRINT : PRINT "ERROR IN DATA STATEMENTS!"
  : PRINT "PROBABLY LOCATED ON OR BEFORE L
  INE " : PEEK (123) + PEEK (124) * 256: END
100 POKE 216,0: POKE 768,0: DIM H(3):H(0) =
  1:H(1) = 16:H(2) = 256:H(3) = 4096
110 VTAB 6: PRINT "ARE YOU ENTERING A HEXADE
  CIMAL": PRINT "FILE?": GET AS: POKE -
  16368,0: PRINT AS
120 IF AS = "N" OR AS = CHR$ (110) THEN GOSUB
  370: POKE 34218,128: GOTO 210
130 IF AS < > "Y" AND AS < > CHR$ (121) THEN
  110
140 POKE 768,1: VTAB 10: CALL - 958: PRINT
  "WHAT IS THE STARTING ADDRESS OF THE": PRINT
  "FILE (IN HEX)": INPUT HS: GOSUB 290:A = H
  IF A < 736 OR A > 39424 THEN PRINT : PRINT
  "INVALID ADDRESS. PLEASE DOUBLE-CHECK": PRINT
  "AND RE-ENTER": GOSUB 350: GOTO 140
160 VTAB 13: CALL - 958: PRINT "WHAT IS THE
  LENGTH OF THE FILE": PRINT "(IN HEX)":
  INPUT HS: GOSUB 290:B = H
170 IF B < 1 OR B > 32000 THEN PRINT "INVAL
  ID LENGTH. PLEASE DOUBLE-CHECK": PRINT "
  AND RE-ENTER": GOSUB 350: GOTO 160
180 TEXT : HOME : NORMAL : POKE 34,1: VTAB 2
  : PRINT "INSTALLING CHECKIT..."
190 IF A > = 6144 THEN GOSUB 320: POKE 579
  9, INT (A / 256): POKE 5798,A - 256 * PEEK
  (5799): POKE 5801, INT (B / 256): POKE 5
  800,B - 256 * PEEK (5801): POKE 5802,0:
  GOTO 230: REM ABOVE $1800 SOMEWHERE
200 IF A < 6144 THEN GOSUB 370: POKE 34215,
  INT (A / 256): POKE 34214,A - 256 * PEEK
  (34215): POKE 34217, INT (B / 256): POKE
  34216,B - 256 * PEEK (34217): POKE 3421
  8,0: GOTO 210: REM BELOW $1800 SOMEWHERE
210 IF PEEK (48896) < > 76 THEN POKE 56,0
  : POKE 57,133: CALL 1002: GOTO 250
220 PRINT CHR$ (4):"IN#$8500": GOTO 250
230 IF PEEK (48896) < > 76 THEN POKE 56,0
  : POKE 57,22: CALL 1002: GOTO 250
240 PRINT CHR$ (4):"IN#$1600": GOTO 250
250 TEXT : HOME : NORMAL : POKE 34,1: VTAB 2
  : PRINT "CHECKIT INSTALLED"
260 IF PEEK (768) = 1 THEN PRINT : PRINT "
  ENTER THE MONITOR BY TYPING": PRINT " CA
  LL -151"
270 NEW
280 END
290 H = 0:L = LEN (HS): ON L < 1 OR L > 4 GOTO
  300: FOR I = 1 TO L:D = ASC ( MID$ (HS,
```

```
I,1)):H = H + H(L - I) * (D - 48 * (D <
  58 AND D > 47) - 55 * (D > 64 AND D < 71
  )): NEXT
300 RETURN
310 REM $1600 VERSION
320 FOR I = 0 TO 377: READ ML: POKE 5632 + I
  ,ML: NEXT I:C = 5632
330 FOR I = 0 TO 18: READ ML: POKE C + ML, PEEK
  (C + ML) - 111: NEXT
340 RETURN
350 VTAB 21: PRINT "PRESS RETURN TO CONTINUE
  ": GET CH$: PRINT CH$: POKE - 16368,0
  : RETURN
360 REM $8500 VERSION
370 FOR I = 0 TO 377: READ ML: POKE 34048 +
  I,ML: NEXT I
380 RETURN
390 DATA 216,32,27,253,201,154,240,31,201,1
  41,208,26,134,224,32,178,133,32,251,218,
  32,128,254,56,165,8
400 DATA 229,9,32,218,253,32,132,254,166,22
  4,169,141,96,32,106,134,44,170,133,16,43
  ,169,1,133,6,169
410 DATA 8,133,7,160,0,177,6,133,251,200,17
  7,6,133,252,240,63,200,177,6,32,79,134,2
  00,177,6,32
420 DATA 79,134,165,251,133,6,165,252,133,7
  ,208,221,173,167,133,133,7,173,166,133,1
  33,6,160,0,177,6
430 DATA 32,79,134,230,6,208,2,230,7,230,25
  1,208,2,230,252,165,251,205,168,133,165,
  252,237,169,133,144
440 DATA 227,162,0,189,171,133,32,237,253,2
  32,224,7,144,245,44,16,192,32,128,254,16
  4,8,166,9,32,64
450 DATA 249,32,251,218,32,132,254,169,152,
  96,0,0,0,0,20,15,20,1,12,58,32,32,106,
  134,133
460 DATA 6,169,2,133,7,160,0,177,6,201,176,
  144,73,201,186,176,69,177,6,44,170,133,1
  6,53,201,210
470 DATA 208,4,166,251,240,61,201,162,208,8
  ,72,169,1,69,251,133,251,104,201,160,208
  ,6,166,251,208,25
480 DATA 240,26,201,191,208,19,132,226,160,
  0,185,117,134,32,79,134,200,192,5,144,24
  5,164,226,176,3,32
490 DATA 79,134,200,196,224,144,188,96,166,
  224,104,104,169,141,96,132,226,136,177,6
  ,201,160,240,249,201,186
500 DATA 240,8,201,176,144,36,201,186,176,3
  2,164,226,200,177,6,201,197,208,23,200,1
  77,6,201,205,208,16
510 DATA 169,210,32,79,134,169,197,32,79,13
  4,169,205,32,79,134,96,164,226,177,6,24,
  144,135,162,8,10
520 DATA 38,8,38,9,144,14,72,165,8,73,33,13
  3,8,165,9,73,16,133,9,104,202,208,232,96
  ,169,0
530 DATA 133,8,133,9,133,251,133,252,96,208
  ,210,201,206,212
540 DATA 16,41,44,73,79,92,97,106,123,128,1
  35,180,203,246,249,261,316,321,326
```

# FONT

# CONVERSION

## Convert Publish It! fonts to system fonts and back again

One of the more popular desktop publishing programs for the Apple II is Publish It! from Timeworks, Inc. It sports a Mac-like interface that anyone can learn in under an hour, and its printer interface has no rival among present competitors. The program's primary weakness is that it comes with only six fonts. To make matters worse, Publish It! fonts appear to be nonstandard. While programs like AppleWorks GS and Medley use standard Apple IIGS system fonts, which have a \$C8 filetype, Publish It! fonts have an \$F7 filetype.

Even though the filetypes are different, the IIGS system fonts can be converted to the Publish It! font format and vice versa. There are many ways to accomplish the conversion, with the most drastic being the use of a block editor to change the filetype in the disk directory. This method is both dangerous and tedious. The easiest way is to use the Font Conversion Utility (FCU) program.

FCU is written in Apple-soft BASIC and works only in ProDOS. The program requires only one disk drive, but for optimum performance, two

drives are recommended. FCU will convert most fonts, but the program size, combined with Applesoft memory restrictions, will not permit the conversion of font files larger than 25,635 bytes.

### USING THE PROGRAM

If you are using a IIGS, you must make sure that Keyboard Buffering is set to No in the Control Panel under the Options page.

When FCU is run, a five-option menu is presented (Figure 1). You can select options from the menu with the arrow keys or by entering the desired option number and pressing Return. The first menu option permits the user to enter the prefix of the font's location.

The program will check drive 1 in slot 2 and both drives in slots 5, 6, and 7 for valid ProDOS volumes.

When all devices have been checked, the program will display a list of online prefix names. To select a prefix, use the Arrow keys to highlight the desired volume and then press Return. If the selected volume contains any subdirectories,

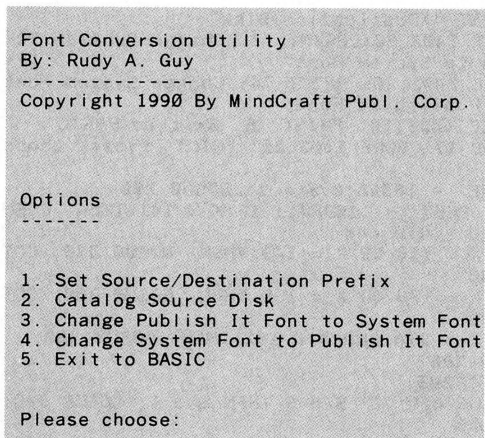


Figure 1: The five-option Menu

*Rudy A. Guy, 1319 W. 10th Street, Erie, PA 16502. This program is compatible with ProDOS on the enhanced IIe, IIc, IIc+, and IIGS.*

**Table 1: Font Conversion's Structure**

Line(s)	Function
80-280	Set up variables and display menu. Maximum number of fonts that the program will handle is 125. Change the DIM statement in line 90 to increase or decrease this number.
290-460	Get keypress and move cursor accordingly.
470-930	Set source/destination prefix.
880-910	Check for on-line volumes.
940-1030	Show catalog of source or destination drive.
1040-1060	Routine to convert Publish It! to System fonts.
1070-1090	Routine to convert System fonts to Publish It! fonts.
1100-1140	Message displayed if no font files are located in the source directory.
1150-1200	Set variables required for selected conversion.
1210-1220	Set prefix if option 1 has not been selected.
1230-1290	Read source directory and store font names in the array FT\$( ). CTR contains the number of font files in the directory.
1300-1350	Read the destination directory to see if a PI.FONTS or GS.FONTS folder exists.
1360-1480	Display font name and prompt user for action to be taken.
1490-1540	Create PI.FONTS or GS.FONTS folder if needed. Convert font and place in appropriate folder.
1550-1570	Exit Program. Reset original prefix.
1580	Centering routine.
1590	Data statements containing possible slot and drive locations.
1600-1770	Error handling routine for font conversion portion of the program.

they will then be displayed. The selection procedure is the same as when the root volume was selected. If no subdirectories are located on the root volume, or in subsequent subdirectories, the program will move on to the "Set Destination" routine.

The destination prefix is set in the same manner as the source prefix. When both prefixes are selected, you are asked if the prefix settings are correct. If you enter an uppercase or lowercase "N," you will be returned to the selection process.

Once the source and destination prefixes have been set, the source and destination directories may be viewed by selecting option 2 from the menu. If the prefixes were not set using option 1, the catalog option will display the files contained in the directory from which FCU was executed.

Option 3 lets you convert Publish It! fonts to GS system fonts, while option 4 converts system fonts to Publish It! fonts. When either of these two options is selected, FCU searches the source directory for the appropriate font types and displays the font names. You can convert the font, skip it, or return to the program menu.

The fonts you convert are placed into a subdirectory that is named PI.FONTS or GS.FONTS. If the destination prefix was set to /DTP/FONTS, and GS System fonts are being converted to Publish It! fonts, the converted fonts will be located at /DTP/FONTS/PI.FONTS.

### Memory Restrictions

To conserve memory, error trapping has been kept to a minimum. If an error does occur during the font conversion segment of the program, the error number will appear

and any conversions will be stopped. With the exception of the credit lines at the beginning of the listing, REM statements have been omitted. To see the structure of the program, refer to Table 1.

### ENTERING THE PROGRAM

Type in the BASIC program from Listing 1 and save it with

SAVE FONT.CONVERT

For more help with entering *Nibble* listings, see the Typing Tips section.

### THE JUNE 1990 DISK CONTAINS THIS PROGRAM

If you'd rather not type in the listing for this program, you can buy it on disk, complete, free of typos and ready to run. *Nibble's* June 1990 programs are available on a single disk for an introductory price of \$12.95 from *Nibble*, 52 Domino Dr., Concord, MA 01742. Add \$2.50 for shipping/handling within the U.S. and Canada; \$7.50 for overseas air mail. Introductory price expires 8/31/90; after that date, the price will be \$16.95. See the *Nibble* Software Directory in this issue for ordering information. ORDER NO.: W32

### LISTING 1: FONT.CONVERT

```

37 10 REM *****
C0 20 REM * FONT.CONVERT *
B9 30 REM * BY RUDY A. GUY *
AE 40 REM * COPYRIGHT(C) 1990 *
CB 50 REM * MINDCRAFT PUBL. CORP. *
24 60 REM * CONCORD, MA 01742 *
45 70 REM *****
9B 80 ONERR GOTO 1600
D0 90 DIM FT$(125),PF$(55)
94 100 D$ = CHR$(4):EC = 1
5E 110 FOR I = 1 TO 7: READ S(I),D(I): NEXT
A6 120 PRINT D$"PREFIX": INPUT P1$
0D 130 PRINT D$"PR#3"
CD 140 HOME:PRINT:VTAB 1:EC = 0
06 150 A$ = "Font Conversion Utility": GOSUB 1580
03 160 A$ = "By: Rudy A. Guy": GOSUB 1580
7A 170 A$ = "-----": GOSUB 1580
9C 180 A$ = "Copyright 1990 By MindCraft Publ. Cor
    p.": GOSUB 1580
06 190 VTAB 8:A$ = "Options": GOSUB 1580
9C 200 A$ = "-----": GOSUB 1580
3D 210 VTAB 11:POKE 1403,20:PRINT "1. Set Sourc
    e/Destination Prefix"
F5 220 POKE 1403,20:PRINT "2. Catalog Source Dis
    k":IF LEN(P3$) = 0 THEN PRINT:GOTO 2
    40
FC 230 PRINT "/Destination Disk"
71 240 POKE 1403,20:PRINT "3. Change Publish It
    Font to System Font"
2A 250 POKE 1403,20:PRINT "4. Change System Font
    to Publish It Font"
29 260 POKE 1403,20:PRINT "5. Exit to BASIC"
E6 270 VTAB 17:POKE 1403,20:PRINT "Please choos
    e:"
1A 280 POKE -16368,0:S = 1:GOSUB 390
76 290 X = PEEK(-16384):IF X = 141 THEN GOSU
    B 420:GOTO 440
B2 300 IF X = 138 OR X = 149 THEN GOSUB 340:GOT
    O 290
31 310 IF X = 136 OR X = 139 THEN GOSUB 360:GOT
    O 290
5F 320 IF X > 176 AND X < 182 THEN GOSUB 380:
    GOTO 290
33 330 GOTO 290
53 340 GOSUB 420:IF S = 5 THEN S = 1:GOSUB 390:
    RETURN

```

```

7E 350 S = S + 1: GOSUB 390: RETURN
CB 360 GOSUB 420: IF S = 1 THEN S = 5: GOSUB 390:
    RETURN
77 370 S = S - 1: GOSUB 390: RETURN
54 380 GOSUB 420: S = X - 176: GOSUB 390: RETURN
28 390 S$ = STR$(S) + ".": INVERSE: VTAB 10 + S
    : POKE 1403,20
75 400 INVERSE: PRINT S$: NORMAL
17 410 VTAB 17: POKE 1403,34: PRINT S: RETURN
69 420 POKE - 16368,0: S$ = STR$(S) + ".": VTAB
    10 + S: POKE 1403,20: PRINT S$: RETURN
26 430 VTAB 17: POKE 1403,34: PRINT S - 1: RETURN

32 440 IF S = 5 THEN GOTO 1550
78 450 ON S GOTO 470,940,1040,1070
0C 460 GOTO 140
10 470 HOME: A$ = "Set Source Prefix": VTAB 1:
    GOSUB 1580
B8 480 EC = 2: TT = 1: GOTO 880
71 490 GOSUB 680: TP$ = PF$(VT - 4): IF TP$ = "ABO
    RT" THEN PRINT D$"PREFIX" P1$: GOTO 140
81 500 VTAB 3: PRINT "Source Prefix": TP$
A4 510 VTAB 5: CALL - 958: GOSUB 800: IF K > 0
    THEN GOSUB 680: TP$ = PF$(VT - 4)
5D 520 IF TP$ = "ABORT" THEN PRINT D$"PREFIX" P1$
    : GOTO 140
3D 530 IF LEFT$(TP$,2) = "AC" OR K = 0 THEN
    PRINT D$"PREFIX": INPUT P2$: GOTO 550
07 540 IF K > 0 THEN 510
B7 550 HOME: A$ = "Set Destination Prefix": VTAB
    1: GOSUB 1580
EC 560 TT = 2: GOTO 880
FF 570 GOSUB 680: TP$ = PF$(VT - 4): IF TP$ = "ABO
    RT" THEN PRINT D$"PREFIX" P1$: P2$ = "": GOT
    O 140
01 580 VTAB 3: PRINT "Destination Prefix": PF$
14 590 VTAB 5: CALL - 958: GOSUB 800: IF K > 0
    THEN GOSUB 680: TP$ = PF$(VT - 4)
62 600 IF TP$ = "ABORT" THEN PRINT D$"PREFIX" P1$
    : GOTO 140
E1 610 IF LEFT$(TP$,2) = "AC" OR K = 0 THEN
    PRINT D$"PREFIX": INPUT P3$: GOTO 630
EA 620 IF K > 0 THEN 590
13 630 HOME: VTAB 5: INVERSE: PRINT "Source Dri
    ve": NORMAL: PRINT: PRINT P2$
BD 640 VTAB 10: INVERSE: PRINT "Destination Driv
    e": NORMAL: PRINT: PRINT P3$
09 650 VTAB 22: INPUT "Are these correct?": YN$: I
    F LEFT$(YN$,1) = "y" OR LEFT$(YN$,1) =
    "Y" THEN GOTO 140
31 660 IF LEFT$(YN$,1) = "n" OR LEFT$(YN$,1)
    = "N" THEN 470
F6 670 PRINT CHR$(7): GOTO 630
16 680 VTAB 5: CALL - 958: FOR I = 1 TO K: POKE
    1403,20: PRINT PF$(I): NEXT
20 690 VT = 5: HT = 20: INVERSE: VTAB VT: POKE 140
    3,HT: PRINT PF$(VT - 4): NORMAL
0D 700 X = PEEK(- 16384): IF X = 141 THEN POKE
    - 16368,0: RETURN
0F 710 IF X = 138 OR X = 149 THEN POKE - 16368,
    0: VTAB VT: POKE 1403,HT: PRINT PF$(VT - 4)
    : GOTO 740
D7 720 IF X = 136 OR X = 139 THEN POKE - 16368,
    0: VTAB VT: POKE 1403,HT: PRINT PF$(VT - 4)
    : GOTO 770
45 730 GOTO 700
77 740 IF VT = K + 4 THEN VT = 5: GOTO 760
11 750 VT = VT + 1
86 760 INVERSE: VTAB VT: POKE 1403,HT: PRINT PF$
    (VT - 4): NORMAL: GOTO 700
5B 770 IF VT = 5 THEN VT = K + 4: GOTO 790
67 780 VT = VT - 1
C5 790 INVERSE: VTAB VT: POKE 1403,HT: PRINT PF$
    (VT - 4): NORMAL: GOTO 700
BD 800 K = 0: PRINT D$"PREFIX" TP$: PRINT D$"PREFIX
    ": INPUT TP$: ON TT GOTO 810,820
B9 810 VTAB 3: PRINT "Source Prefix": TP$: GOTO 83
    0
F9 820 VTAB 3: PRINT "Destination Prefix": TP$
1B 830 PRINT D$"OPEN " TP$ ",TDIR": PRINT D$"READ "
    TP$
79 840 INPUT T$: IF MID$(T$,18,3) = "DIR" THEN
    K = K + 1: PF$(K) = MID$(T$,2,16): GOTO 84
    0

```

```

57 850 IF LEFT$(T$,2) < > "BL" THEN 840
68 860 PRINT D$"CLOSE": IF K = 0 THEN RETURN
B8 870 PF$(K + 1) = "ACCEPT CURRENT PREFIX": PF$(K
    + 2) = "ABORT": K = K + 2: RETURN
3C 880 K = 0: I = 0
EC 890 I = I + 1
09 900 PRINT D$"PREFIX,S" S(I)",D" D(I): K = K + 1:
    PRINT D$"PREFIX": INPUT PF$(K)
F8 910 IF I < 7 THEN 890
EF 920 K = K + 1: PF$(K) = "ABORT"
E0 930 ON TT GOTO 490,570
F8 940 EC = 3: HOME: IF LEN(P3$) = 0 THEN PRIN
    T D$"CATALOG": GOTO 1000
F6 950 VTAB 12: PRINT "(S)ource or (D)estination
    drive?"
00 960 X = PEEK(- 16384): IF X = 155 THEN POKE
    - 16368,0: RETURN
F7 970 IF X = 211 OR X = 243 THEN POKE - 16368,
    0: PRINT D$"CATALOG" P2$: GOTO 1000
3D 980 IF X = 196 OR X = 228 THEN POKE - 16368,
    0: PRINT D$"CATALOG" P3$: GOTO 1000
4E 990 GOTO 960
57 1000 POKE - 16368,0
0F 1010 VTAB 24: PRINT "Press RETURN for the menu
    .":
F6 1020 X = PEEK(- 16384): IF X = 141 THEN POK
    E - 16368,0: GOTO 140
B9 1030 GOTO 1020
B5 1040 FL = 0: CTR = 0: CVR = 1
BE 1050 GOSUB 1150: GOSUB 1210: GOSUB 1360
25 1060 GOTO 140
CF 1070 FL = 0: CTR = 0: CVR = 2
58 1080 GOSUB 1150: GOSUB 1210: GOSUB 1360
D2 1090 GOTO 140
E4 1100 HOME: VTAB 12: A$ = "No " + M2$ + " fonts
    found.": GOSUB 1580
E0 1110 VTAB 23: PRINT "Press any key for the men
    u.":
9B 1120 POKE - 16368,0
1B 1130 X = PEEK(- 16384): IF X > 127 THEN POK
    E - 16368,0: GOTO 140
AE 1140 GOTO 1130
C2 1150 ON CVR GOSUB 1170,1190
7B 1160 RETURN
45 1170 T1$ = "$F7": T2$ = "$C8": F1$ = "GS.FONTS": F
    2$ = "PI.FONTS": M1$ = "System": M2$ = "Publi
    sh.It"
5C 1180 RETURN
01 1190 T1$ = "$C8": T2$ = "$F7": F1$ = "PI.FONTS": F
    2$ = "GS.FONTS": M1$ = "Publish.It": M2$ = "S
    ystem"
6F 1200 RETURN
DE 1210 IF LEN(P2$) = 0 THEN P2$ = P1$
05 1220 IF LEN(P3$) = 0 THEN P3$ = P2$
F6 1230 HOME: VTAB 12: A$ = "Please wait. Reading
    directory.": GOSUB 1580
2C 1240 PRINT D$"OPEN " P2$ ",TDIR": PRINT D$"READ
    " P2$
8B 1250 INPUT A$
38 1260 IF MID$(A$,18,3) = T1$ THEN CTR = CTR +
    1: FT$(CTR) = A$
BC 1270 IF LEFT$(A$,1) = "B" THEN 1290
34 1280 GOTO 1250
5E 1290 PRINT D$"CLOSE"
38 1300 PRINT D$"OPEN " P3$ ",TDIR": PRINT D$"READ
    " P3$
5F 1310 INPUT A$: IF MID$(A$,2,8) = F1$ THEN F1
    = 1
73 1320 IF LEFT$(A$,1) = "B" THEN 1340
F0 1330 GOTO 1310
4A 1340 PRINT D$"CLOSE"
1A 1350 RETURN
A0 1360 HOME
77 1370 IF CTR = 0 THEN POP: GOTO 1100
D1 1380 FOR I = 1 TO CTR: VTAB 12: PRINT "Convert
    ": INVERSE: PRINT MID$(FT$(I),2,16)::
    NORMAL: PRINT " to a " M1$ " font?"
8B 1390 VTAB 23: PRINT "<ESC> for menu, <SPACE> t
    o skip, <RETURN> to convert."
31 1400 GOSUB 1430
C5 1410 NEXT I
F0 1420 PRINT D$"PREFIX" P2$: RETURN
85 1430 POKE - 16368,0
80 1440 X = PEEK(- 16384)

```

LISTING 1: FONT.CONVERT *continued*

```

1F 1450 IF X = 155 THEN POKE - 16368,0:I = CTR:
      RETURN
0B 1460 IF X = 160 THEN POKE - 16368,0: RETURN
E5 1470 IF X = 141 THEN POKE - 16368,0: GOTO 14
      90
01 1480 GOTO 1440
09 1490 IF F1 = 1 THEN 1510
83 1500 PRINT D$"CREATE "P3$;F1$;F1 = 1
93 1510 PRINT D$"BLOAD "P2$; MID$ (FT$(I),2,16)",
      T"T1$";A$2200"
53 1520 PRINT D$"CREATE "P3$;F1$/" MID$ (FT$(I),
      2,16)",T"T2$
68 1530 PRINT D$"BSAVE "P3$;F1$/" MID$ (FT$(I),2
      ,16)",T"T2$";A$2200,L" MID$ (FT$(I),67,5)
78 1540 HOME : RETURN
28 1550 HOME : VTAB 12: INPUT "Are you sure you w
      ant to quit?";YN$
F9 1560 IF LEFT$ (YN$,1) = "y" OR LEFT$ (YN$,1)
      = "Y" THEN PRINT D$"PREFIX"P1$: TEXT :
      HOME : END
13 1570 HOME : GOTO 140
77 1580 HT = 40 - LEN (A$) / 2: POKE 1403,HT:
      PRINT A$: RETURN
6C 1590 DATA 2,1,5,1,5,2,6,1,6,2,7,1,7,2
8C 1600 ER = PEEK (222):EL = PEEK (218) + PEEK
      (219) * 256
AE 1610 IF (ER = 8 OR ER = 3) AND EC = 2 THEN I =
      I + 1: RESUME
D2 1620 IF ER = 2 AND EC = 2 THEN 910
29 1630 HOME : VTAB 12
A6 1640 IF (ER = 8 OR ER = 3) AND EC = 3 THEN 173
      0

```

```

DE 1650 IF EC = 1 AND ER = 8 THEN PRINT "Please
      close your drive door.": VTAB 23: PRINT "Pr
      ess a key to continue.": GOTO 1710
EC 1660 IF EC = 2 AND ER = 6 THEN PRINT "Please
      place ";: INVERSE : PRINT P1$:: NORMAL :
      PRINT " in any drive.": GOTO 1710
2D 1670 PRINT "An error has occurred in line "EL"
      ."
1C 1680 PRINT "The error code is "ER"."
74 1690 PRINT "Please refer to your ProDOS and Ap
      plesoft manual."
B0 1700 VTAB 23: PRINT "Press a key for the main
      menu."
89 1710 X = PEEK ( - 16384): IF X > 127 THEN POK
      E - 16368,0: PRINT D$"Prefix"P1$: RUN
B1 1720 GOTO 1710
57 1730 PRINT "Please check your drive door and m
      ake sure that the correct disks are inserte
      d in your drives."
FB 1740 VTAB 23: PRINT "Press <ESC> for menu. Pre
      ss any other key to try again."
2E 1750 X = PEEK ( - 16384): IF X = 151 THEN POK
      E - 16368,0: PRINT D$"PREFIX"P1$: RUN
02 1760 IF X > 127 THEN POKE - 16368,0: GOTO 94
      0
1F 1770 GOTO 1750

```

TOTAL: 5DCB

END OF LISTING 1

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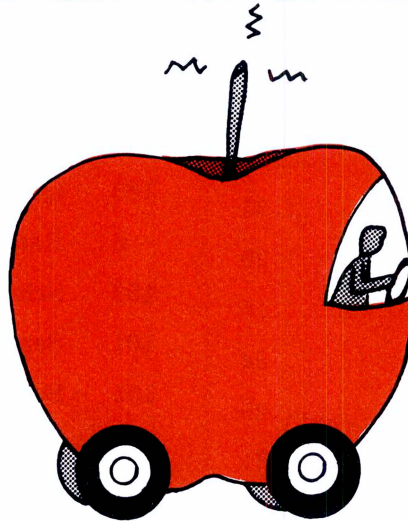
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## USING THE PROGRAM

When you run the program, you will be faced with the main menu. Move the menu cursor with the arrow keys and press Return to make your selection.

If you are using the program for the first time, choose the third option, Configure/Start or Delete. This menu has four choices. Choose the configure option. Enter Y if you have a printer and Y again if you have 80-column capability. If you don't have a printer or 80-column card, enter N for both. Press Return to accept the default value displayed at the cursor.

*Matt Cox, 7 Harm on Place, New City, NY 10956. This program is compatible with DOS 3.3 and ProDOS on the enhanced IIe, IIc, IIc+, and IIGS.*

After you configure the program, you must enter information about your car. First enter the car name. If it already exists on the disk, you will be told so and given options to abort the operation or replace the original data. The name of your car can contain up to 11 characters (but they must all be valid ProDOS characters).

Once you've entered your car's name, you must enter the current mileage on its odometer. You should enter this when you have a full tank of gas. This will ensure that all future mileage calculations will be accurate. All future mileage entries should come from the car's trip odometer, which must be reset to zero each time you buy gas. You can include up to six cars.

Your next step is to enter data. The car you most recently used will be the car you enter data for. (If you wish to change cars, use the main menu's Select Car option.)

On the data entry screen, underscores show you each item's maximum length. When

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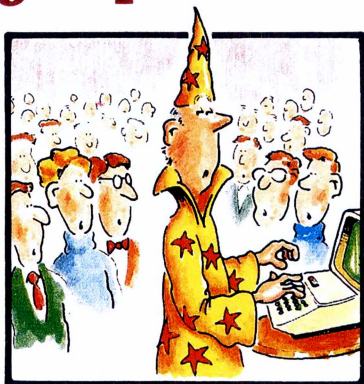
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entering data, press the Return key to move on to the next field. Pressing Control-S will accept the data you entered.

The first item you enter is the transaction type. There are two categories. The first, Gas Fill Up, requires that you enter the date, miles on trip odometer at the time of fill-up, and the quantity (in gallons) of gas. You can also include comments.

The second category, Any Other Expense, gives you space to enter all other operating costs of your automobile and comments relating to the payment. These may include oil, maintenance, insurance, monthly payments, lease payments, depreciation, and so on. You must also enter the date.

You may enter M to get back to the main menu.

The date field is eight characters long. Enter the date in the mm/dd/yy format. You can enter the month or day as one digit, but all three items must be entered and separated by slashes (/) only. A beep will sound if your input is unsatisfactory.

The amount of transaction is the total cost of the items involved. It can be eight characters long. If you got whatever you got for free (your uncle owns a gas station), enter 0 — don't just press Return.

The comment field is 20 characters long. Include any comments you find relevant. All characters, including the colon and comma, are "legal" in this particular field.

After all the data is entered, you will be back up at the date field again. If everything is correct, press Control-S and it will be saved to disk.

Once you have entered some data, you will want to create some reports. Three are available: Cost & Mileage, Mileage alone, and Cost alone.

The Cost & Mileage report displays the records for any single year (or all years) and shows you miles per gallon, cost per mile (for each fill-up at total), the current odometer reading, your comments, and totals and averages for everything. You must have an 80-column card or a printer to get this report. The mileage report shows miles, gallons, and MPG, and the cost report shows dates, costs, and comments.

The program's last option is car deletion. To delete a car, select the third menu option, choose the delete option, choose the car you want to delete, and confirm the action when the program asks.

## ENTERING THE PROGRAM

Type in the program from Listing 1 and save it with

SAVE APPLE.ODOMETER

For more help with entering *Nibble* listings see the Typing Tips section.

## HOW THE PROGRAM WORKS

I set the data file's record length to 55 bytes. This is a little more than you need, but it provides a margin for expansion or modification.

The program creates three files. The first is the system configuration file, which contains the printer slot, 80-column card slot, and 80-column to 40-column control code. The second file is the Names file, which keeps track of the names of the cars on file. Finally, each car has a file. Record 0 contains the starting mileage and the number of entries. Each other record contains a transaction. This file is a random-access file; the other two are sequential files.

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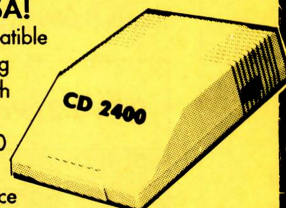
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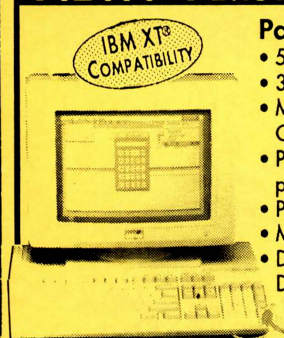


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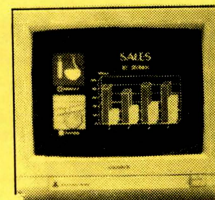
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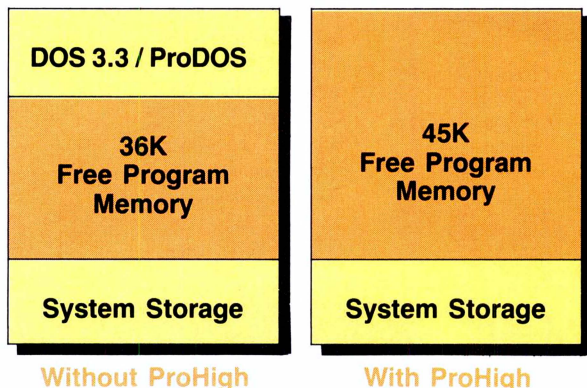
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Table 1: Program Routines

Line#	Purpose
80-140	Define variables & the main menu
150-210	Start transaction entry, define variables, read files
220-270	Set up entry screen
280-350	Start entry, get transaction type
370-540	Enter expense only
380-450	Enter date
460-500	Enter amount
510-530	Enter comments
560-630	Enter date
640-700	Enter amount
710-740	Enter miles
750-780	Enter gallons
790	Calculate and display MPG
800-820	Enter comments
850-870	Write disk file, clear variables, go to menu
890-900	Trap errors, quit if recovery not available
940-2380	REPORTS
910-920	Read & set up configuration file
930-960	Check to make sure car has data, do menu
980-1510	Cost & mileage report
1020-1080	Get output mode and year to print for
1090-1110	Print headings
1120-1240	Display each entry and total some columns
1310-1320	End report, calculate averages
1330-1340	Finish up, turn off printer/80-column card
1350-1370	Do expense-only output
1380	Get output type
1390-1720	Format output routines
1410-1460	Format date
1470-1510	Format miles
1520-1560	Format gallons
1570-1630	Format & calculate MPG
1640-1690	Format amount
1700-1770	Format & calculate cost per mile
1780-1970	Mileage report
1800-1810	Get output type
1840-1850	Print headings
1870-1920	Print each record, total up miles & gallons
1940-1950	Calculate totals & averages, finish report
1960-1970	Finish up, turn off printer
1980-2190	Cost report
1990-2030	Get output type
2040-2050	Print headings
2060-2180	Get & print each record, total cost
2200-2210	Error trapping for all reports
2220-2880	CONFIGURE/START/DELETE
2230-2240	Menu & titles
2260-2410	Configure system
2430-2790	Start new car
2800-2990	Delete a car
3000-3040	SELECT A CAR
3050-3060	Routine to read configuration file
3100	Routine to exit gracefully
3110-3510	MAIN SUBROUTINES (called often)
3490	Center line
3280-3300	Routine to print title on top of screen
3330-3460	Line input routine
3470	Yes/No/Menu question
3490-3510	Error Trapping (Control-C check) and Exit

The program contains many routines that will be useful in other programs; Table 1 lists all the routines and subroutines. The most useful has to be the menu routine in lines 3150-3270. Set the variable NC to the number of choices, the elements of the array CH\$( ) to the name of each choice, and call the routine. The routine returns the value of the

choice taken in the variable C. If you choose the top entry, for instance, C will contain 1. Line 3140 contains a routine to center a line on the screen. Just set A\$ equal to the line you want centered, and GOSUB to the routine. The line will be printed at the current vertical cursor position.

In lines 3320-3440, you'll find a routine that allows you to define the maximum length of an input string (to a maximum of 255). Set LN equal to the length of the string, A\$ equal to the prompt, VP equal to the vertical position, and call the routine. Arrows are printed around the area where the string is to be entered. For instance, if A\$="ENTER NAME" and LN=15, you will see on the screen:

```
ENTER NAME ->          <-
```

You can also call this routine at line 3330 if you don't want the arrows and prompt to appear. Just set VP and LN like before, and set HP to the horizontal position on the screen. This is what I did in the transaction entry routine.

#### THE JUNE 1990 DISK CONTAINS THIS PROGRAM

If you'd rather not type in the listing for this program, you can buy it on disk, complete, free of typos and ready to run. *Nibble's* June 1990 programs are available on a single disk for an introductory price of \$12.95 from *Nibble*, 52 Domino Dr., Concord, MA 01742. Add \$2.50 for shipping/handling within the U.S. and Canada; \$7.50 for overseas air mail. Introductory price expires 8/31/90; after that date, the price will be \$16.95. See the *Nibble* Software Directory in this issue for ordering information. ORDER NO.: W32

#### LISTING 1: APPLE.ODOMETER

```

37 10 REM *****
C0 20 REM * APPLE.ODOMETER *
B9 30 REM * BY MATT COX *
AE 40 REM * COPYRIGHT(C) 1990 *
CB 50 REM * MINDCRAFT PUBL. CORP. *
24 60 REM * CONCORD, MA 01742 *
45 70 REM *****
9F 80 PRINT CHR$(21):D$ = CHR$(4): DIM L$(25
)
71 90 ONERR GOTO 870
E4 100 PRINT D$:"VERIFY CAR.NAMES"
2E 110 ONERR GOTO 3480
1F 120 HOME :DN = 0:B$ = "BY MATT COX": GOSUB 328
0: VTAB 5: HTAB 6: PRINT "(C) 1990 MINDCRAF
T PUBL. CORP."
DB 130 CH$(1) = "ENTER MILEAGE/EXPENSE":CH$(2) = "
PRINTED REPORTS MENU":CH$(3) = "CONFIGURE S
YSTEM/START OR DELETE CAR":CH$(4) = "SELECT
A CAR":CH$(5) = "EXIT PROGRAM":NC = 5:
GOSUB 3150
CC 140 ON C GOTO 150,890,2220,2960,3100
29 150 ONERR GOTO 870
53 160 FL = 0:CO$ = "":AM$ = "":GL$ = "":MI$ = "":
DT$ = ""
A6 170 POKE 34,23
D6 180 TEXT
12 190 IF NC$ = "" THEN RT = 1: GOSUB 2960
C5 200 B$ = "ENTER FILL-UP/EXPENSES": GOSUB 3280
E9 210 POKE 34,23: PRINT D$:"OPEN CAR.":NC$="":L55
": PRINT D$:"READ CAR.":NC$="":R0": INPUT A$
,NE: PRINT D$:"CLOSE CAR.":NC$: TEXT
BF 220 INVERSE : FOR X = 1 TO 40: VTAB 8: HTAB X:
PRINT " ": VTAB 22: HTAB X: PRINT " ":
NEXT X
51 230 FOR X = 8 TO 21: VTAB X: PRINT " ": NORMA
L : HTAB 40: INVERSE : PRINT " ": NEXT X:
NORMAL
C6 240 A$ = NC$: VTAB 7: GOSUB 3110
EF 250 VTAB 7: PRINT "ENTRY # ":NE + 1: VTAB 10:
HTAB 3: PRINT "ENTRY TYPE ":NU = 1: GOSUB

```

```

3310: VTAB 10: HTAB 25: PRINT "DATE ":NU
= 8: GOSUB 3310: VTAB 11: HTAB 13: PRINT "
AMOUNT ":NU = 8: GOSUB 3310: VTAB 15: HTAB
3: PRINT "MILES ON LAST TANK ":NU = 6:
GOSUB 3310
EE 260 VTAB 16: HTAB 3: PRINT "GALLONS TAKEN ":N
U = 5: GOSUB 3310: HTAB 28: INVERSE : PRINT
"MPG.": NORMAL : VTAB 20: HTAB 6: PRINT "C
OMMENTS ":NU = 20: GOSUB 3310: PRINT : VTA
B 13: INVERSE : FOR X = 1 TO 39: PRINT " ":
NEXT X: VTAB 17: FOR X = 1 TO 40: PRINT "
": NEXT X: NORMAL
1C 270 POKE 34,22: HOME : TEXT : VTAB 23: HTAB 2:
PRINT "ENTER: 1-GAS FILL UP": HTAB 29:
PRINT "M-MAIN MENU": VTAB 24: HTAB 9: PRIN
T "2-ANY OTHER EXPENSE":
48 280 VTAB 10: HTAB 14: GET I$: PRINT I$
69 290 IF I$ = "1" OR I$ = "2" OR I$ = "M" THEN 3
10
95 300 PRINT CHR$(7): GOTO 280
B0 310 POKE 34,22: HOME : TEXT : VTAB 23: HTAB 3:
PRINT "<": INVERSE : PRINT "RETURN":
NORMAL : PRINT "> TO VERIFY <": INVERSE
: PRINT "ESC": NORMAL : PRINT "> TO CORREC
T": WAIT - 16384,128:A = PEEK ( - 16384):
POKE - 16368,0: IF A - 128 = 13 THEN 340
B8 320 IF A - 128 < > 27 THEN 310
25 330 GOTO 270
46 340 IF I$ = "M" THEN 120
03 350 ON VAL (I$) GOTO 550,370
51 360 PRINT CHR$(7): GOTO 270
4A 370 TY = 2
A6 380 POKE 34,22: HOME : TEXT : VTAB 23:A$ = "EN
TER DATE OF TRANSACTION": GOSUB 3110
67 390 VP = 10:HP = 30:LN = 8: FOR X = 1 TO LEN (
DT$):LN$(X) = MID$ (DT$,X,1): NEXT X:MP =
LEN (DT$) + 1: GOSUB 3330:DT$ = IN$
A9 400 IF DT$ = "" THEN PRINT CHR$(7): GOTO 39
0
55 410 FOR Q = 1 TO LEN (DT$): IF MID$ (DT$,Q,1
) = "/" THEN NS = NS + 1
66 420 NEXT Q
5B 430 IF NS < > 2 THEN PRINT CHR$(7):NS = 0
: GOTO 390
01 440 NS = 0
2F 450 IF QU = 1 AND DN = 1 THEN 840
5B 460 POKE 34,22: HOME : TEXT : VTAB 23:A$ = "EN
TER AMOUNT OF TRANSACTION": GOSUB 3110:VP =
11:HP = 20:LN = 8: FOR X = 1 TO LEN (AM$)
:LN$(X) = MID$ (AM$,X,1): NEXT X:MP = LEN
(DT$) + 1: GOSUB 3330
2F 470 IF IN$ = "0" THEN 510
10 480 IF VAL (IN$) = 0 THEN PRINT CHR$(7):
GOTO 460
0F 490 AM = VAL (IN$):AM = INT (AM + 100 + .5) /
100:AM$ = STR$ (AM): VTAB 11: HTAB 20:
PRINT AM$: IF LEN (AM$) < > 8 THEN FOR
X = 1 TO 8 - LEN (AM$): PRINT CHR$(95):
NEXT X
7E 500 IF QU = 1 AND DN = 1 THEN 840
87 510 POKE 34,22: HOME : TEXT : VTAB 23:A$ = "EN
TER ANY IMPORTANT COMMENTS": GOSUB 3110
6D 520 VP = 20:HP = 15:LN = 20:FL = 1: FOR X = 1 T
O LEN (CO$):LN$(X) = MID$ (CO$,X,1): NEXT
X:MP = LEN (CO$) + 1: GOSUB 3330:CO$ = IN
$:FL = 0
FB 530 IF QU = 1 AND DN = 1 THEN 840
B8 540 DN = 1: GOTO 380
84 550 TY = 1
11 560 POKE 34,22: HOME : TEXT : VTAB 23:A$ = "EN
TER DATE OF TRANSACTION": GOSUB 3110
77 570 VP = 10:HP = 30:LN = 8: FOR X = 1 TO LEN (
DT$):LN$(X) = MID$ (DT$,X,1): NEXT X:MP =
LEN (DT$) + 1: GOSUB 3330:DT$ = IN$
70 580 FOR Q = 1 TO LEN (DT$): IF MID$ (DT$,Q,1
) = "/" THEN NS = NS + 1
48 590 NEXT Q
3B 600 IF NS < > 2 THEN PRINT CHR$(7):NS = 0
: GOTO 570
EB 610 NS = 0
AB 620 IF DT$ = "" THEN PRINT CHR$(7): GOTO 57
0

```

LISTING 1: APPLE.ODOMETER *continued*

```

50 630 IF QU = 1 AND DN = 1 THEN 840
5F 640 POKE 34,22: HOME : TEXT : VTAB 23:AS = "EN
    TER AMOUNT OF TRANSACTION": GOSUB 3110
89 650 VP = 11:HP = 20:LN = 8: FOR X = 1 TO LEN (
    AMS):LNS(X) = MID$(AMS,X,1): NEXT X:MP =
    LEN (AMS) + 1: GOSUB 3330
3B 660 IF INS = "0" THEN 690
E5 670 IF VAL (INS) > .001 THEN 690
87 680 PRINT CHR$(7): GOTO 650
23 690 AM = VAL (INS):AM = INT (AM * 100 + .5) /
    100:AM$ = STR$(AM): HTAB 20: VTAB 11:
    PRINT AM$: IF LEN (AM$) < > 8 THEN FOR
    X = 1 TO 8 - LEN (AM$): PRINT CHR$(95):
    : NEXT X
F8 700 IF QU = 1 AND DN = 1 THEN 840
F8 710 POKE 34,22: HOME : TEXT : VTAB 23:AS = "EN
    TER MILES ON TRIP ODOMETER": GOSUB 3110:VP
    = 15:HP = 22:LN = 6: FOR X = 1 TO LEN (MI
    $):LNS(X) = MID$(MI$,X,1): NEXT X:MP =
    LEN (MI$) + 1: GOSUB 3330:MI$ = INS
60 720 IF MI$ = "" OR VAL (MI$) = 0 THEN POKE 3
    4,22: HOME : VTAB 23:AS = "INCORRECT ENTRY!
    !" + CHR$(7) + CHR$(7): GOSUB 3110: FOR
    X = 1 TO 1000: NEXT X: GOTO 710
27 730 MI = VAL (MI$):MI = INT (MI * 10 + .5) /
    10:MI$ = STR$(MI): VTAB 15: HTAB 22: PRIN
    T MI$: IF LEN (MI$) < > 6 THEN FOR X =
    1 TO 6 - LEN (MI$): PRINT CHR$(95): NEX
    T X
62 740 IF QU = 1 AND DN = 1 THEN 840
12 750 POKE 34,22: HOME : TEXT : VTAB 23:AS = "EN
    TERS GALLONS TAKEN AT FILL-UP": GOSUB 3110:
    HP = 17:VP = 16:LN = 5: FOR X = 1 TO LEN (
    GL$):LNS(X) = MID$(GL$,X,1): NEXT X:MP =
    LEN (GL$) + 1: GOSUB 3330:GL$ = INS
55 760 IF GL$ = "" OR VAL (GL$) = 0 THEN POKE 3
    4,22: HOME : VTAB 23:AS = "INCORRECT ENTRY!
    !" + CHR$(7) + CHR$(7): GOSUB 3110: FOR
    X = 1 TO 1000: NEXT X: GOTO 750
99 770 GL = VAL (GL$):GL = INT (GL * 10 + .5) /
    10:GL$ = STR$(GL): VTAB 16: HTAB 17: PRIN
    T GL$: IF LEN (GL$) < > 5 THEN FOR X =
    1 TO 5 - LEN (GL$): PRINT CHR$(95): NEX
    T X
84 780 IF QU = 1 AND DN = 1 THEN 840
A9 790 MP = MI / GL:MP = INT (MP * 100 + .5) / 10
    0:MP$ = STR$(MP): VTAB 16: HTAB 33: PRINT
    " " : VTAB 16: HTAB 33: PRINT LEFT$(
    MP$,6):" "
AD 800 POKE 34,22: HOME : TEXT : VTAB 23:AS = "EN
    TER ANY IMPORTANT COMMENTS": GOSUB 3110
3B 810 FL = 1:VP = 20:HP = 15:LN = 20: FOR X = 1 T
    O LEN (CO$):LNS(X) = MID$(CO$,X,1): NEXT
    X:MP = LEN (CO$) + 1: GOSUB 3330:CO$ = IN
    $:FL = 0
BB 820 IF QU = 1 AND DN = 1 THEN 840
9C 830 DN = 1: GOTO 560
B6 840 PRINT : POKE 34,23: HOME :QU = 0: PRINT D$
    : "OPEN CAR.":NC$: "L55": PRINT D$: "READ CAR
    .":NC$: "R0": INPUT RS: PRINT D$:
    "WRITE CAR.":NC$: "R0": PRINT AS: PRINT VA
    L (R$) + 1: PRINT D$: "WRITE CAR.":NC$: "R":
    VAL (R$) + 1
BA 850 PRINT TY: PRINT DT$: PRINT AMS: PRINT MI$:
    PRINT GL$: PRINT CO$: PRINT D$: "CLOSE CAR.
    ":NC$
F4 860 QU = 0:TY = 0:DN = 0:DT$ = "":AM$ = "":MI$
    = "":MP$ = "":GL$ = "":CO$ = "": TEXT :
    GOTO 110: TEXT : PRINT
96 870 IF PEEK (222) = 6 THEN PRINT D$"OPEN CAR
    .NAMES": PRINT D$"WRITE CAR.NAMES": PRINT 0
    : PRINT D$"CLOSE CAR.NAMES": GOTO 110
A0 880 GOTO 3480
4F 890 ONERR GOTO 2200
57 900 POKE 34,23: HOME : PRINT D$: "VERIFY CAR.CO
    NFIG"
86 910 PRINT D$: "OPEN CAR.CONFIG": PRINT D$: "READ
    CAR.CONFIG": INPUT PS,EC: PRINT D$: "CLOSE
    CAR.CONFIG": TEXT :AC = 1
4D 920 IF NC$ = "" THEN RT = 1: GOSUB 2960
30 930 PRINT D$: "OPEN CAR.":NC$: "L55": PRINT D$:
    "READ CAR.":NC$: "R0": INPUT AS,R$: PRINT D
    $: "CLOSE CAR.":NC$:R = VAL (R$): IF R = 0
    THEN HOME : VTAB 11:AS = "NO DATA FOR CAR
    SELECTED": GOSUB 3110: GOSUB 3510:NC$ = ""
    : GOTO 120
79 940 B$ = "REPORTS": GOSUB 3280:CH$(1) = "COST &
    MILEAGE REPORT":CH$(2) = "MILEAGE REPORT":
    CH$(3) = "COST REPORT":CH$(4) = "RETURN TO
    MAIN MENU":NC = 4: GOSUB 3150
6B 950 XM = 0:TG = 0:TM = 0:TC = 0:CP = 0:PM = 0:A
    P = 0:MP = 0
4A 960 ON C GOTO 970,1780,1980,110
9B 970 IF EC = 0 AND PS = 0 THEN HOME : VTAB 11:
    AS = "EIGHTY COLUMN CARD OR PRINTER REQUIRE
    D": GOSUB 3110: GOSUB 3510: GOTO 940
C6 980 B$ = "MILEAGE & COST REPORT": GOSUB 3280
69 990 IF PS = 0 THEN MO = 1: GOTO 1050
33 1000 IF EC = 0 THEN MO = 2: GOTO 1050
03 1010 GOSUB 1380
62 1020 IF AS = "S" OR AS = "s" THEN MO = 1: GOTO
    1050
4C 1030 IF AS < > "P" AND AS < > "p" THEN 1010
54 1040 MO = 2
A4 1050 VTAB 13: PRINT "ENTER YEAR (A FOR ALL) --
    > ":NU = 2: GOSUB 3310:HP = 28:VP = 13:LN
    = 2: GOSUB 3330:PY$ = INS: IF PY$ = "A" OR
    PY$ = "a" THEN 1070
93 1060 IF VAL (PY$) = 0 AND PY$ < > "0" AND PY
    $ < > "00" THEN 1050
54 1070 IF MO = 1 THEN PRINT D$: "PR#":EC: PRINT
    CHR$(12)
91 1080 IF MO = 2 THEN PRINT D$: "PR#":PS: PRINT
    CHR$(9): "80N"
0F 1090 AS = "MILEAGE & COST REPORT FOR " + NC$:
    PRINT SPC( (74 - LEN (AS)) / 2):AS: PRIN
    T
AD 1100 PRINT "
    COST PER": PRINT " DATE MI
    LE
    AGE GALLONS MPG COST MILE
    COMMENTS"
FA 1110 PRINT "-----"
F2 1120 CN = 0
55 1130 PRINT D$: "OPEN CAR.":NC$: "L55": PRINT D$
    : "READ CAR.":NC$: "R0": INPUT SM$: INPUT RS
    :R = VAL (R$)
00 1140 FOR RN = 1 TO R
90 1150 PRINT D$: "READ CAR.":NC$: "R":RN
BA 1160 CO$ = "": INPUT TY: INPUT DT$: INPUT AM$:
    INPUT MI$: INPUT GL$
94 1170 FOR X = 1 TO 25: GET AS: IF AS = CHR$(1
    3) THEN 1190
C0 1180 CO$ = CO$ + AS: NEXT X
80 1190 PRINT : ON TY GOTO 1200,1350
B7 1200 GOSUB 1390: IF PY$ = "A" THEN 1220
BC 1210 IF YR$ < > RIGHT$(PY$,2) THEN 1260
BC 1220 GOSUB 1470: GOSUB 1520: GOSUB 1570: GOSUB
    1640: GOSUB 1700
47 1230 TM = TM + VAL (MI$):TG = TG + VAL (GL$):
    PM = PM + VAL (MP$):AP = AP + VAL (CP$)
67 1240 PRINT DT$: " ":MI$: " ":GL$: " ":MP$: " "
    :AM$: " ":CP$: " ":CO$:NP = 1
4F 1250 TC = TC + VAL (AM$)
1A 1260 IF TY = 1 THEN XM = XM + VAL (MI$)
20 1270 NEXT RN
FF 1280 PRINT D$: "CLOSE CAR.":NC$
D4 1290 FOR X = 1 TO 74: PRINT "-": NEXT X: PRIN
    T
F3 1300 IF NP = 0 THEN 1330
38 1310 MI$ = STR$(TM): GOSUB 1470:TM$ = MI$:GL$
    = STR$(TG): GOSUB 1520:GA$ = GL$:MI$ = T
    M$:GL$ = GA$: GOSUB 1570:AM$ = STR$(TC):
    GOSUB 1640:AS$ = AM$:AM$ = AS$:MI$ = TM$:
    GOSUB 1700
8B 1320 PRINT "TOTALS " :TM$: " ":GA$: "
    ":AS$:MI = XM + VAL (SM$):MI$ = STR$(MI
    ): GOSUB 1470: PRINT "AVERAGES
    ":MP$: " ":CP$: PRINT :
    PRINT "CURRENT ODOMETER READING: " :MI$
A7 1330 NP = 0: IF MO = 2 THEN PRINT D$: "PR#0":
    GOTO 940
B7 1340 PRINT : PRINT : PRINT SPC(30): "HIT ANY
    KEY FOR MENU": WAIT - 16384,128: POKE - 1

```

```

6368,0: PRINT CHR$(21): GOTO 940
42 1350 GOSUB 1390:MI$ = "":GL$ = "
    ":MP$ = "": IF PY$ = "A" THEN 1370
A9 1360 IF YR$ < > RIGHT$(PY$,2) THEN 1260
0F 1370 GOSUB 1640:CP$ = "":GOTO 1240
A6 1380 VTAB 11: PRINT "PRINT TO SCREEN OR PRINTE
    R (S/P) --> *": CHR$(8):: GET AS: PRINT AS
    : RETURN
BA 1390 FOR Q = 1 TO LEN(DT$): IF MID$(DT$,Q,
    1) = "/" THEN MN$ = LEFT$(DT$,Q - 1): GOT
    O 1410
E2 1400 NEXT Q
D6 1410 T = Q + 1:X = 0: FOR X = T TO LEN(DT$):
    IF MID$(DT$,X,1) = "/" THEN DY$ = MID$
    (DT$,T,X - T):YR$ = RIGHT$(DT$, LEN(DT$)
    - X): GOTO 1430
28 1420 NEXT X
F1 1430 IF LEN(MN$) = 1 THEN MN$ = "0" + MN$
69 1440 IF LEN(DY$) = 1 THEN DY$ = "0" + DY$
C4 1450 IF LEN(YR$) = 1 THEN YR$ = "0" + YR$
5A 1460 DT$ = MN$ + "/" + DY$ + "/" + YR$:DT$ =
    LEFT$(DT$,9): RETURN
1A 1470 FOR X = 1 TO LEN(MI$): IF MID$(MI$,X,
    1) = "." THEN 1490
84 1480 NEXT X:MI$ = MI$ + ".0"
3B 1490 IF LEN(MI$) = 7 THEN 1510
86 1500 FOR X = 1 TO 7 - LEN(MI$):MI$ = " " + M
    I$: NEXT X
EE 1510 MI$ = LEFT$(MI$,7): RETURN
3E 1520 FOR X = 1 TO LEN(GL$): IF MID$(GL$,X,
    1) = "." THEN 1540
73 1530 NEXT X:GL$ = GL$ + ".0"
A7 1540 IF LEN(GL$) = 7 THEN 1560
81 1550 FOR X = 1 TO 7 - LEN(GL$):GL$ = " " + G
    L$: NEXT X
BB 1560 GL$ = LEFT$(GL$,7): RETURN
FC 1570 MP = VAL(MI$) / VAL(GL$):MP = INT(MP
    * 100 + .5) / 100:MP$ = STR$(MP)
4D 1580 FOR X = 1 TO LEN(MP$): IF MID$(MP$,X,
    1) = "." THEN 1600
36 1590 NEXT X:MP$ = MP$ + ".00": GOTO 1610
69 1600 IF X = LEN(MP$) - 1 THEN MP$ = MP$ + "0"
7A 1610 IF LEN(MP$) = 5 THEN 1630
84 1620 FOR X = 1 TO 5 - LEN(MP$):MP$ = " " + M
    P$: NEXT X
9E 1630 MP$ = LEFT$(MP$,5): RETURN
82 1640 FOR X = 1 TO LEN(AM$): IF MID$(AM$,X,
    1) = "." THEN 1660
1B 1650 NEXT X:AM$ = AM$ + ".00": GOTO 1670
C2 1660 IF X = LEN(AM$) - 1 THEN AM$ = AM$ + "0"
E6 1670 IF LEN(AM$) = 8 THEN 1690
B2 1680 FOR X = 1 TO 8 - LEN(AM$):AM$ = " " + A
    M$: NEXT X
F9 1690 AM$ = LEFT$(AM$,8): RETURN
89 1700 CP = VAL(AM$) / VAL(MI$):CP = INT(CP
    * 1000 + .5) / 1000:CP$ = STR$(CP)
F0 1710 FOR X = 1 TO LEN(CP$): IF MID$(CP$,X,
    1) = "." THEN 1730
D0 1720 NEXT X:CP$ = CP$ + ".000": GOTO 1750
80 1730 IF X = LEN(CP$) - 2 THEN CP$ = CP$ + "0"
2C 1740 IF X = LEN(CP$) - 1 THEN CP$ = CP$ + "0"
50 1750 IF LEN(CP$) = 8 THEN 1770
A0 1760 FOR X = 1 TO 8 - LEN(CP$):CP$ = " " + C
    P$: NEXT X
49 1770 CP$ = LEFT$(CP$,8): RETURN
66 1780 B$ = "MILEAGE REPORT": GOSUB 3280: VTAB 9:
    IF PS = 0 THEN MO = 1: GOTO 1830
1D 1790 GOSUB 1380
92 1800 IF AS = "S" OR AS = "s" THEN MO = 1: GOTO
    1830
C8 1810 IF AS < > "P" AND AS < > "p" THEN 1790
BB 1820 MO = 2
B5 1830 IF MO = 2 THEN PRINT D$;"PR#":PS
C0 1840 HOME:AS = "MILEAGE REPORT FOR " + NC$:
    GOSUB 3110: PRINT "DATE MI
    LEAGE GALLONS MPG": PRINT "
    -----"
0D 1850 IF MO = 1 THEN POKE 34,4
94 1860 PRINT D$;"OPEN CAR.":NC$;"L55": PRINT D$
    ;"READ CAR.":NC$;"R0": INPUT SM$:R:SM =

```

```

VAL(SM$)
41 1870 FOR RN = 1 TO R
EE 1880 PRINT D$;"READ CAR.":NC$;"R":RN: INPUT T
    Y,DT$,X$,MI$,GL$
FA 1890 IF TY = 2 THEN 1930
FE 1900 GOSUB 1390: GOSUB 1470: GOSUB 1520: GOSUB
    1570
88 1910 PRINT "DT$:" "MI$:" "GL$:" "MP
    $
F6 1920 TM = TM + VAL(MI$):TG = TG + VAL(GL$)
E8 1930 NEXT RN: PRINT D$;"CLOSE CAR.":NC$
C4 1940 MI$ = STR$(TM): GOSUB 1470:GL$ = STR$(
    TG): GOSUB 1520: GOSUB 1570
D3 1950 PRINT "FOR X = 1 TO 33: PRINT "-":
    : NEXT X: PRINT "TOTALS "MI$
    ;"GL$: PRINT "AVERAGE
    "MP$
F4 1960 IF MO = 2 THEN PRINT D$;"PR#0": GOTO 940
DE 1970 PRINT: PRINT:AS = "HIT ANY KEY": GOSUB
    3110: WAIT - 16384,128: POKE - 16368,0:
    GOTO 940
5B 1980 B$ = "COST REPORT": GOSUB 3280
8E 1990 IF PS = 0 THEN MO = 1: GOTO 2030
B0 2000 GOSUB 1380: IF AS = "P" OR AS = "p" THEN
    MO = 2: GOTO 2030
50 2010 IF AS < > "S" AND AS < > "s" THEN 2000
45 2020 MO = 1
07 2030 IF MO = 2 THEN PRINT D$;"PR#":PS
08 2040 HOME:AS = "COST REPORT FOR " + NC$: GOSU
    B 3110
3A 2050 PRINT: PRINT "DATE AMOUNT C
    OMMENTS": PRINT "-----"
2B 2060 IF PM = 1 THEN POKE 34,4
99 2070 PRINT D$;"OPEN CAR.":NC$;"L55": PRINT D$
    ;"READ CAR.":NC$;"R0": INPUT X,R
92 2080 FOR RN = 1 TO R
25 2090 PRINT D$;"READ CAR.":NC$;"R":RN
EC 2100 INPUT X,DT$,AM$,X$,X$:CO$ = "": FOR X = 1
    TO 20: GET AS: IF AS = CHR$(13) THEN 212
    0
9A 2110 CO$ = CO$ + AS: NEXT X
91 2120 PRINT: GOSUB 1390: GOSUB 1640
61 2130 PRINT DT$:"AM$:"CO$
E8 2140 TC = TC + VAL(AM$)
4C 2150 NEXT RN
32 2160 PRINT D$;"CLOSE CAR.":NC$
A9 2170 FOR X = 1 TO 39: PRINT "-": NEXT X: PRIN
    T
C3 2180 AM$ = STR$(TC): GOSUB 1640: PRINT "TOTAL
    "AM$
2A 2190 GOTO 1960
33 2200 IF PEEK(222) = 6 THEN HOME: VTAB 11:A
    $ = "SYSTEM NOT CONFIGURED": GOSUB 3110:
    WAIT - 16384,128: POKE - 16368,0: GOTO 1
    10
75 2210 GOTO 3480
2E 2220 HOME: VTAB 3:B$ = "CONFIGURE/START/DELET
    E": GOSUB 3110: GOSUB 3280
9B 2230 CH$(1) = "CONFIGURE/RE-CONFIGURE SYSTEM":C
    H$(2) = "START A NEW CAR":CH$(3) = "DELETE
    A CAR":CH$(4) = "RETURN TO MAIN MENU":NC =
    4: GOSUB 3150
F6 2240 ON C GOTO 2250,2420,2790,110
BD 2250 ONERR GOTO 2400
14 2260 PRINT D$;"VERIFY CAR.CONFIG": GOSUB 3050
C9 2270 B$ = "RE-CONFIGURE SYSTEM"
20 2280 GOSUB 3280
56 2290 VTAB 9: PRINT "PRINTER IN SYSTEM? ":PS$
    : VTAB 11: PRINT "EIGHTY COLUMN IN SYSTEM?
    ":EC$
BA 2300 VTAB 9: HTAB 22: GET PS$: PRINT PS$: IF P
    S$ < > "Y" AND PS$ < > "y" AND PS$ < > "
    n" AND PS$ < > "N" AND PS$ < > CHR$(13)
    THEN PRINT CHR$(7): GOTO 2300
58 2310 IF PS$ = "N" OR PS$ = "n" THEN PS = 0
86 2320 IF PS$ = "Y" OR PS$ = "y" THEN PS = 1
AF 2330 VTAB 11: HTAB 28: GET EC$: PRINT EC$: IF
    EC$ < > "Y" AND EC$ < > "N" AND EC$ < >
    "y" AND EC$ < > "n" AND EC$ < > CHR$(13)
    ) THEN PRINT CHR$(7): GOTO 2330
7D 2340 IF EC$ = "Y" OR EC$ = "y" THEN EC = 3

```

LISTING 1: APPLE.ODOMETER *continued*

```

32 2350 IF EC$ = "N" OR EC$ = "n" THEN EC = 0
64 2360 VTAB 20: GOSUB 3470: IF A$ = "Y" OR A$ =
    "y" THEN 2390
BF 2370 IF A$ < > "N" AND A$ < > "n" THEN 2360
B8 2380 GOTO 2290
91 2390 PRINT D$;"OPEN CAR.CONFIG": PRINT D$;"WRI
    TE CAR.CONFIG": PRINT PS: PRINT EC: PRINT D
    $;"CLOSE CAR.CONFIG": AC = 1: GOTO 2220
AF 2400 IF PEEK (222) = 6 THEN B$ = "CONFIGURE S
    YSTEM": GOTO 2280
23 2410 GOTO 3480
DB 2420 ONERR GOTO 2460
5B 2430 PRINT D$;"OPEN CAR.NAMES": PRINT D$;"READ
    CAR.NAMES": INPUT NC: PRINT D$;"CLOSE CAR.
    NAMES": IF NC = 0 THEN ND = 1
AB 2440 IF NC > 0 THEN PRINT D$;"OPEN CAR.NAMES"
    : PRINT D$;"READ CAR.NAMES": INPUT NC: FOR
    X = 1 TO NC: INPUT CN$(X): NEXT X: PRINT D$
    ;"CLOSE CAR.NAMES"
FD 2450 IF NC = 6 THEN HOME : VTAB 11: HTAB 2:
    PRINT "I CAN'T HOLD ANY MORE CAR NAMES. SO
    RRY.": GOSUB 3510: GOTO 2220
E8 2460 B$ = "START A NEW CAR": GOSUB 3280
26 2470 CR$ = "": VTAB 9:A$ = "ENTER CAR NAME":LN
    = 11: GOSUB 3320
32 2480 CR$ = IN$: IF CR$ = "" THEN VTAB 11: PRIN
    T CHR$(7): GOTO 2470
21 2490 ONERR GOTO 3520
62 2500 PRINT D$"VERIFY CAR."CR$
2F 2510 VTAB 11: GOSUB 3470
AE 2520 IF A$ = "Y" OR A$ = "y" THEN 2550
F2 2530 IF A$ < > "N" AND A$ < > "n" THEN 2510
0C 2540 GOTO 2470
61 2550 ONERR GOTO 2770
16 2560 FOR C = 1 TO NC: IF CN$(C) = CR$ THEN 258
    0
01 2570 NEXT C: GOTO 2620
66 2580 VTAB 13: PRINT "THAT CAR ALREADY EXISTS.
    DO YOU WANT": PRINT "TO REPLACE IT (Y/N) --
    > *": CHR$(8):: GET A$: PRINT A$
27 2590 IF A$ = "Y" OR A$ = "y" THEN DC$ = CR$:RT
    = 1: GOSUB 2890: POKE 34,10: HOME : TEXT :
    GOTO 2620
41 2600 IF A$ < > "N" AND A$ < > "n" THEN 2580
0B 2610 POKE 34,10: HOME : TEXT :IN$ = "":CR$ = "
    ": GOTO 2470
BA 2620 ML$ = "": VTAB 11:A$ = "ENTER MILEAGE TO D
    ATE":LN = 10: GOSUB 3320:ML$ = IN$: IF ML$
    = "" THEN PRINT CHR$(7): GOTO 2620
E2 2630 VTAB 13: GOSUB 3470
0B 2640 IF A$ = "Y" OR A$ = "y" THEN 2670
5D 2650 IF A$ < > "N" AND A$ < > "n" THEN 2630
2F 2660 GOTO 2620
7B 2670 ML = VAL (ML$):ML = INT (ML * 100 + .5)
    / 100:ML$ = STR$(ML)
1E 2680 PRINT D$"OPEN CAR."CR$",L55": PRINT D$"WR
    ITE CAR."CR$",R0": PRINT ML$: PRINT 0:
    PRINT D$"CLOSE CAR."CR$
2E 2690 ONERR GOTO 2750
E2 2700 PRINT D$"OPEN CAR.NAMES": PRINT D$"READ C
    AR.NAMES": INPUT NC: PRINT D$"CLOSE CAR.NAM
    ES": ON NC = 0 GOTO 2710: PRINT D$"OPEN CAR
    .NAMES": PRINT D$"READ CAR.NAMES": INPUT NC
    : FOR X = 1 TO NC: INPUT NC$(X): NEXT X:
    PRINT D$"CLOSE CAR.NAMES"
0C 2710 PRINT D$;"OPEN CAR.NAMES": PRINT D$;"WRI
    TE CAR.NAMES": IF ND = 1 THEN ND = 0: PRINT
    NC + 1: PRINT CR$: GOTO 2730
E7 2720 PRINT NC + 1: FOR X = 1 TO NC: PRINT NC$(
    X): NEXT X: PRINT CR$
19 2730 PRINT D$;"CLOSE CAR.NAMES"
7A 2740 NC$ = CR$: GOTO 2220
DA 2750 PRINT D$"CLOSE CAR.NAMES": IF PEEK (222)
    = 5 THEN NC = 1:ND = 1: GOTO 2710
71 2760 GOTO 3480
0A 2770 IF PEEK (222) = 6 THEN 2620
12 2780 GOTO 3480
06 2790 ONERR GOTO 2940
BA 2800 B$ = "DELETE A CAR": GOSUB 3280: PRINT D$"
    VERIFY CAR.NAMES"
C5 2810 PRINT D$;"OPEN CAR.NAMES": PRINT D$;"READ
    CAR.NAMES": INPUT NC: IF NC = 0 THEN PRIN
    T D$"CLOSE CAR.NAMES": POKE 222,6: GOTO 294
    0
65 2820 FOR X = 1 TO NC: INPUT CN$(X): NEXT X:
    PRINT D$;"CLOSE CAR.NAMES"
05 2830 FOR X = 1 TO NC:CH$(X) = CN$(X): NEXT X:
    GOSUB 3150
EC 2840 DC$ = CN$(C)
6B 2850 POKE 34,8: HOME : TEXT : VTAB 9: FLASH :
    PRINT "DELETE ":DC$: NORMAL
C0 2860 VTAB 11: PRINT "ARE YOU SURE (Y/N) --> *"
    : CHR$(8):: GET A$: PRINT A$
77 2870 IF A$ = "N" OR A$ = "n" THEN 2220
3E 2880 IF A$ < > "Y" AND A$ < > "y" THEN 2860
4A 2890 PRINT D$;"DELETE CAR.":DC$
DF 2900 FOR X = C + 1 TO NC:CN$(X - 1) = CN$(X):
    NEXT X:NC = NC - 1
1A 2910 IF NC = 0 THEN PRINT D$"OPEN CAR.NAMES":
    PRINT D$"WRITE CAR.NAMES": PRINT 0: PRINT
    D$"CLOSE CAR.NAMES": GOTO 2220
97 2920 PRINT D$;"OPEN CAR.NAMES": PRINT D$;"WRI
    TE CAR.NAMES": PRINT NC: FOR X = 1 TO NC:
    PRINT CN$(X): NEXT X: PRINT D$;"CLOSE CAR.
    NAMES":NC$ = "": IF RT = 1 THEN RT = 0:
    RETURN
BD 2930 GOTO 2220
80 2940 IF PEEK (222) = 6 THEN HOME : VTAB 11:A
    $ = "NO CARS ON FILE": GOSUB 3110: GOSUB 35
    10: GOTO 2220
28 2950 GOTO 3480
3C 2960 ONERR GOTO 3030
BB 2970 PRINT D$;"OPEN CAR.NAMES": PRINT D$;"READ
    CAR.NAMES": INPUT NC: IF NC = 0 THEN PRIN
    T D$"CLOSE CAR.NAMES": GOTO 3030
D0 2980 FOR X = 1 TO NC: INPUT NC$(X): NEXT X:
    PRINT D$;"CLOSE CAR.NAMES"
74 2990 IF NC = 1 THEN C = 1: GOTO 3010
1C 3000 B$ = "SELECT A CAR": GOSUB 3280: FOR X = 1
    TO NC:CH$(X) = NC$(X): NEXT X: GOSUB 3150
58 3010 NC$ = NC$(C): IF RT = 1 THEN RT = 0: RETUR
    N
82 3020 GOTO 110
B5 3030 IF PEEK (222) = 6 OR NC = 0 THEN TEXT :
    HOME : VTAB 11:A$ = "NO CARS ON FILE": POK
    E 49168,0: GOSUB 3110: GOSUB 3510: GOTO 120
78 3040 GOTO 3480
83 3050 POKE 34,23: PRINT D$;"OPEN CAR.CONFIG":
    PRINT D$;"READ CAR.CONFIG":
B4 3060 INPUT PS: INPUT EC: INPUT EO$: PRINT D$;"
    CLOSE CAR.CONFIG": TEXT :EC$ = "N":PS$ = "N
    "
C8 3070 IF PS = 1 THEN PS$ = "Y"
06 3080 IF EC = 3 THEN EC$ = "Y"
B1 3090 RETURN
DA 3100 HOME : PRINT "GOODBYE...": GOTO 3500
F1 3110 NORMAL : PRINT SPC( (40 - LEN (A$)) / 2
    ):A$: IF DN = 1 THEN VTAB 24: HTAB 2:
    INVERSE : PRINT "PRESS <CTRL-S> TO SAVE OR
    ESC TO EXIT": NORMAL
F7 3120 RETURN
7A 3130 HTAB ((40 - LEN (A$)) / 2 + 1): INVERSE
    : PRINT A$: RETURN
4E 3140 NORMAL : HTAB ((40 - LEN (A$)) / 2 + 1):
    PRINT A$: RETURN
0B 3150 POKE - 16368,0:Z = FRE (0): PRINT :VT =
    13 - NC:: FOR DI = 1 TO NC: VTAB (VT + DI
    * 2):A$ = CH$(DI): GOSUB 3110:SP(DI) = VT
    + DI * 2: NEXT DI:C = 1
7A 3160 POKE 34,21: HOME : TEXT : VTAB 22: HTAB 8
    : INVERSE : PRINT "<--": NORMAL : PRINT "
    ": INVERSE : PRINT "-->": NORMAL : PRINT "
    "<": INVERSE : PRINT "RETURN": NORMAL
    : PRINT "> <": INVERSE : PRINT "ESC":
    NORMAL : PRINT ">"
20 3170 A$ = CH$(C): VTAB (SP(C)): GOSUB 3130
75 3180 WAIT - 16384,128:A = PEEK ( - 16384) -
    128: POKE - 16368,0
ED 3190 IF A = 27 THEN 120
C5 3200 IF A = 13 THEN NORMAL : RETURN
2E 3210 IF A = 21 OR A = 10 THEN OC = C:C = C + 1
    : GOTO 3240
D2 3220 IF A = 8 OR A = 11 THEN OC = C:C = C - 1:
    GOTO 3240
03 3230 GOTO 3180
67 3240 VTAB (SP(OC)):A$ = CH$(OC): GOSUB 3140
E0 3250 IF C = NC + 1 THEN C = 1

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4F 3260 IF C = 0 THEN C = NC
9E 3270 GOTO 3170
73 3280 TEXT : HOME : VTAB 3:AS = "THE APPLE ODOM
ETER": GOSUB 3110: VTAB 4:AS = B$: GOSUB 31
10
BC 3290 FOR X = 1 TO 6: NORMAL : VTAB X: HTAB 4:
INVERSE : PRINT " ";; NORMAL : HTAB 37:
INVERSE : PRINT " ";; NEXT X: NORMAL
DB 3300 VTAB 1: HTAB 4: INVERSE : PRINT "
": NORMAL : VTAB 6
: HTAB 4: INVERSE : PRINT "
": NORMAL : RETURN : REM
33 AND 33 SPACES
16 3310 FOR X = 1 TO NU: PRINT CHR$ (95);: NEXT
X: RETURN
D0 3320 PRINT A$;" ->";:HP = PEEK (36) + 1:VP
= PEEK (37) + 1: PRINT SPC( LN);"<-"
8B 3330 IN$ = "": HTAB HP: VTAB VP:P = 1
64 3340 HTAB HP + P - 1: GET I$: PRINT I$;
7F 3350 IF I$ = CHR$ (27) AND DN = 1 THEN 120
60 3360 IF I$ = CHR$ (32) AND FL = 1 THEN 3420
9F 3370 IF I$ = CHR$ (32) THEN PRINT CHR$ (8);
: GOTO 3340
4E 3380 IF I$ = CHR$ (13) THEN MP = MP - (EL = 0
): GOTO 3450
EC 3390 IF I$ = CHR$ (8) OR I$ = CHR$ (127) THE
N P = P - 1: IF P = 0 THEN P = 1: HTAB HP:
PRINT CHR$ (7);
31 3400 IF I$ = CHR$ (8) OR I$ = CHR$ (127) THE
N 3340

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27 3410 IF I$ = CHR$ (19) THEN QU = 1: GOTO 3450
E4 3420 IF ASC (I$) < > 95 AND ASC (I$) > 31
THEN LN$(P) = I$:P = P + 1: IF P = LN + 1
THEN PRINT CHR$ (7);:P = P - 1:EL = 1:
HTAB (HP + LN - 1)
D0 3430 IF P > MP THEN MP = P
E0 3440 GOTO 3340
1B 3450 FOR T = 1 TO MP:IN$ = IN$ + LN$(T): NEXT
T:EL = 0
B8 3460 FOR Q = 1 TO MP:LN$(Q) = "": NEXT :MP = 0
: RETURN
E9 3470 PRINT "IS THIS CORRECT (Y/N) --> *"; CHR$
(8);: GET A$: PRINT A$: RETURN
3E 3480 IF PEEK (222) = 255 THEN RESUME
37 3490 PRINT : PRINT "ERROR # "; PEEK (222);" IN
LINE "; PEEK (218) + PEEK (219) * 256;".
: PRINT "PROGRAM TERMINATED"
7D 3500 END
C0 3510 VTAB 23: HTAB 8: PRINT "PRESS RETURN TO C
ONTINUE";: GET ZZ$: HTAB 1: VTAB 23: PRINT
"";: CALL - 958: RETURN
CA 3520 IF PEEK (222) = 16 THEN 2470
B2 3530 GOTO 2510

```

TOTAL: 829B

END OF LISTING 1

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Many people still use the old DOS because there was so much good software written for it. It is easy to learn, easy to modify, and easy to use from machine language. We acknowledge that our readers are looking for state-of-the-art information and programs. We also know that they seek new methods to use the gigabytes of older DOS 3.3 material.

The two DOS 3.3-related programs in April illustrate our commitment to support the old Apple II users in their quest to take advantage of newer technology, by simplifying the porting of programs from DOS 3.3 to ProDOS (ProDOS Linker), and speeding up existing DOS 3.3 programs on the IIGS (RAM Disk 3.3).

By the way, we certainly share your

dream for the future of the Apple II with a 20 Mhz processor! We'd love to see one too.

## VERSATILITY II

► This is a letter to tell you how great the Apple II is. I have a IIGS, and I have not found any application I cannot do with the IIGS, AppleWorks, and the TimeOut series from Beagle Bros. I use it in my home, business, and education. Examples include science projects for school, kitchen inventory and lunch count at the school, membership, finance, desktop publishing for a dairy goat club, and of course budgets, cash flows, and taxes.

I would like to encourage you to keep up the Apple II line, and to push it aggressively for all types of applications.

I am a member of Big Red Computer Club and National Appleworks Users Group.

Becky Jo Schnauffer  
Keyes, OK

## REVIEWING REVIEWS

► I must address a few comments in Neil Shapiro's review of 2088: The Cryllan Mission (April 1990). As you know, my brothers and I have been submitting programs to *Nibble* since 1982. In 1988 we formed Victory Software to write 2088.

The review closes by stating, "But it was obviously a family effort in programming and design that might well have benefited from an outside editor." Neil's remark would imply that family-owned companies are inferior to more corporate counterparts.

I cannot agree with his comments regarding our manual, since we have not received complaints from our customers. Furthermore, I cannot agree with his comments regarding our novel approach to conversation. In fact, our customers have enjoyed it.

Many companies have completely ignored the need for IIGS-specific software. Victory Software, however, has written a true IIGS application and, in the process, created a role-playing game with some unconventional features, such as our conversation.

While many companies are deserting the Apple II market, Victory Software has made a strong commitment to the Apple IIGS. In a few months, we will release two more IIGS-specific products.

Vinay Pai  
President  
Victory Software  
Houston, Texas

# "...the single most important business-oriented product for the Apple II since AppleWorks."

## APPLE II

BY CHARLES H. GAJEWAY

**Masterful database.** Are you ready for a sweeping statement? Here goes: I think that *DB Master Professional* (Stone Edge Technologies: \$295) is the single most important business-oriented product for the Apple II since the introduction of *AppleWorks*. As the only true relational database program for the Apple IIe, IIC, and IIGS, *DBMP* can give a 128K Apple II the kind of data-handling power and flexibility normally associated with MS-DOS and Macintosh systems running expensive and hard-to-learn software. (A relational database can link, or *relate*, information from several data files.)

I jumped right into the program with my standard test data—a pair of files that tracks a record collection, with information on album titles, artists, music category, song lengths, and composers. This test is complex, and many well-regarded programs—including *AppleWorks*—have failed miserably at it. Even with very little

experience, I was able to get the system up and running with *DBMP* in a surprisingly short time.

Report generation is extremely powerful, making it easy to design anything from a mailing label, to a point-of-sale invoice (that automatically updates inventory records, of course), to customized form letters. Whereas most database programs must be combined with a word processor to do complex reports or mail merge, *DBMP* does it all.

The manuals are complete, well illustrated, and generally clear, although they are sometimes overly technical and fragmented. You will need to keep both books handy at all times, especially as you try out some of the more sophisticated features. And while the program is operated with a simple menu system, *DBMP* takes a fair amount of time to learn because of its array of features and options. *DBMP* gives you all the power you need and can even import your current files from *AppleWorks* (except version 3.0) and other programs. ■

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## DB Master Professional

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Neil Shapiro replies:

My comments about 2088 were, for the most part, positive. But I did call out two faults with the game. The more subjective of these was that the dialogue given to the townspeople seems to be overdone, too long, and certainly not realistic. This is an opinion, but I feel most people who play

2088 will agree.

My complaint with the manual is not so subjective. It lacks complete diagrams of screen displays, a tutorial, charts of opponents' strengths, and a step-by-step explanation of combat.

I did state that "once you get past the manual, if you can treat the townspeople with a sort of half-eared indul-

gence, I think you'll find 2088 to be the first RPG to take full advantage of the Apple IIGS." I agree that it was a "bold and unconventional approach." I also agree that Victory has created a "true GS application." That's why I recommended that people investigate the game. 🍏

## THE ERROR TRAP

■ **Another Applesoft Mover** (Vol. 10/No. 8, Listing 1: MOVER, p. 57): Two lines were left out. Insert the following two lines between lines 63993 and 63994. You will either have to renumber the program in order to do so, or retype lines 63989 through 63993 and start numbering them at 63985.

```
63993 AL = 16385:AH = 16386:L =  
( PEEK (175) + (256 * PEEK (176)))  
- 2048: REM set high and low  
byte pointers and length of prgm
```

```
63994 POKE AH, PEEK (AH) + 64 -  
8:AL = PEEK (AL) + (256 * PEEK  
(AH)):AH = AL + 1: IF(AH - 16386)  
< L THEN 63990: REM parse through  
prgm and change high byte pointers
```

■ **Hi-Res Color Scout** (Vol. 11/No. 4, Listing 2: COLORSCOUT.BIN, p. 75): The commands to zero memory were incorrect and cause the program to break into the system monitor. If you used an assembler use the following command after CALL-151:

```
2112:Ø N 2113>2112.21FEM
```

If you entered Listing 2 enter the following commands:

```
BLOAD COLORSCOUT.BIN  
CALL-151  
2108:AD 13 21 85 43 AØ ØØ 4C 2C FE
```

Press Control-C, then enter

```
BSAVE COLORSCOUT.BIN,A$2ØØØ,L$78F
```

### Tech Support

If you need help with your *Nibble* program, contact the Nibble Technical Support Staff at *Nibble*, 52 Domino Drive, Concord, MA 01742. Please include a self-addressed, stamped envelope. Phone support is available on the Tech Support line from Monday through Friday between 2 and 5 PM EST at (508) 371-1669.

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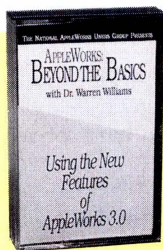
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CIRCLE NUMBER 158

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available through June 1. Apple Computer will be taking four booths, and will show its support by sponsoring a breakfast and a hospitality suite and supplying more computers and equipment. Some of the other Apple II vendors at the show include Beagle Bros, Chinook, Broderbund, Applied Engineering, Ingenuity Inc., Stone Edge Technology, Roger Wagner, and Addison-Wesley. *Apple Fiesta 1990, P.O. Box 34056, Phoenix, AZ 85067; (602) 992-5515.*

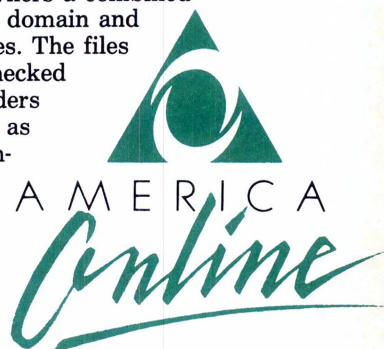
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■ The telecommunications service **America Online** offers Apple II and Macintosh owners a combined 10,000 public domain and shareware files. The files are quality-checked by forum leaders in such areas as business, communications, desktop publishing, user groups, and utilities, among others.

Compression and decompression programs are included with the America Online software, which costs \$5.95 a month and hourly rates of \$5 evenings and weekends, \$10 weekdays. *Quantum Computer Services, Inc., 8619 Westwood Center Dr., Vienna, VA, 22182; (800) 227-6364.*

CIRCLE NUMBER 160

**ASK NIBBLE** *continued from page 9*

**Table 1: PIN Values**

Position	Value	Meaning	Purpose
1	1	Printer	Mode of serial port
	2	Communications	
2	1	6 data bits, 1 stop bit	Serial data protocol
	2	6 data bits, 2 stop bits	
	3	7 data bits, 1 stop bit	
	4	7 data bits, 2 stop bits	
	5	8 data bits, 1 stop bit	
	6	8 data bits, 2 stop bits	
3	1	110 (bits per second)	Baud rate
	2	300	
	3	1200	
	4	2400	
	5	4800	
	6	9600	
	7	19200	
4	1	None	Parity setting
	2	Even	
	3	Odd	
	4	Mark	
	5	Space	
5	1	No screen echo	Screen echo control
	2	Screen echo	
6	1	No LF after CR	Line feed after Return?
	2	LF after CR	
7	1	No CR	Return after "x" characters
	2	CR after 40 chars.	
	3	CR after 72	
	4	CR after 80	
	5	CR after 132	

These commands are usually done by printing a Control-I character followed by a value and a modifier character. For example, to set the baud rate to 9600 baud, a BASIC program would use the line:

```
PRINT CHR$(9); "14B"
```

"14" is the control value for the Control-I-x-B command for the Super Serial Card or Apple IIc (or IIGS) serial port. The space allotted for this column is insufficient for a complete listing of serial port commands, but the information you need is in the manual for the Super Serial Card and in the reference manuals for the Apple IIe, IIc, or IIGS.

# Coming Soon!

► **Virtual Memory** — Your Applesoft arrays can now be as large as your disk media! This machine-language utility will store and retrieve large arrays from a disk in small portions as they are needed by your program.

► **Disk Encrypter** — Keep unwanted eyes from viewing your disks by encoding the entire disk. Only you will know the password to decipher them.

► **Pawns** — Practice your chess strategy as you face off against the Apple in a race of pawns on the Hi-Res screen.

# Send In Your Entries!!!!

The One-Liner and Two-Liner Contests are ongoing events with several winners chosen every month! If you're one of the lucky winners, you can choose your favorite Nibble disk as your prize... just for having fun on your own. All you need to do is create the most interesting, attractive, useful, and/or clever program that can be typed using just one or two program lines.

Since this issue of *Nibble* will be hitting the newsstands so close to the Fourth of July, it seemed only fitting that a Hi-Res display of fireworks should win a prize. Just type in this two-liner, run it and watch as the fireworks explode on your monitor. For Fireworks, Ben Houston of Delta, BC, Canada will be receiving the Nibble disk Super Works.

```
4D 1 DIM X1(405): HGR2 : FOR A
    = 1 TO 9E9: RESTORE :B
    = 0:H = RND (1) * 179
    + 50:V = RND (1) * 89
    + 20: FOR I = 1 TO 3:
    READ A(I),C(I),D(I),E(I)
    :Y(I) = 0: NEXT : FOR G
    = 0 TO 32 STEP .5: FOR
    I = 1 TO 3:A(I) = A(I) +
    .0005: HCOLOR= 3:X = C(
    I) * (1 + SIN ((A(I) -
    75) / A(I))):Y(I) = Y(I)
    + D(I):S% = 189 - X - (
    V - E(I))
E2 2 H$ = H$ + Y(I),S%: H$ = H$ + Y(I),S%:X1(B) = Y(I)
    :B = B + 1:X1(B) = S%B
    = B + 1: NEXT I,G:R = 8
    : FOR C = 1 TO 3: FOR I
    = 0 TO 400 STEP R:
    HCOLOR= 0: H$ = H$ + X1
    (I),X1(I + 1): H$ = H$ +
    X1(I),X1(I + 1): NEXT
    : R = R / 2: NEXT C,A: DAT
    A 1.1,32, 25,14, .998,28,
    .5,6,1.0815,28, .5,
```

TOTAL: 3131

So the award shows are over for another year. We now know who the best actor, actress, movie, singer, etc. were for 1989. If you're like most of us, you were not

fortunate enough to get your name up in lights. Curt Esser of Crystal Lake, IL, has a solution. MARQUEES is a two-liner that puts your name, or any other message, up in lights on the Apple screen.

When MARQUEES is run, a question mark will appear on the screen. At this prompt, enter the number of lines of text contained in your message (1-10). The program will then prompt you, with a question mark, for each line of your message. Each line of the message can be no more than 37 characters long. After the last line of the message is entered, the marquee is lit and your name or message will appear in lights for all to see.

```
BC 1 S = 38: INPUT N: FOR I = 1
    TO N: INPUT A$(I): NEXT
    :V = 10 - N: HOME :
    INVERSE : VTAB V + 2:
    FOR I = 1 TO N * 2 + 1:
    HTAB 4: FOR F = 1 TO 33
    : PRINT " ": NEXT :
    PRINT " ": NEXT : VTAB V +
    3: FOR I = 1 TO N:H = 2
    1 - LEN (A$(I)) / 2:
    HTAB H: PRINT A$(I):
    PRINT : NEXT : NORMAL :
    FOR F = 1 TO 50: VTAB V
    : PRINT " ": FOR I = 1
    TO 18: PRINT " ": NEX
    T : PRINT : FOR I = 1 TO
    N + 1
DC 2 PRINT " ": HTAB 39: PRIN
    T " ": PRINT " ": HTAB
    39: PRINT " ": NEXT :
    PRINT " ": HTAB 39:
    PRINT " ": FOR I = 1 TO
    19: PRINT " ": NEXT :
    PRINT " ": VTAB V: FOR
    I = 1 TO 19: PRINT " ":
    : NEXT : PRINT " ": FOR
    I = 1 TO N + 1: PRINT "
```

```
": HTAB 39: PRINT " ":
PRINT " ": HTAB 39:
PRINT " ": NEXT : PRINT
" ": HTAB 39: PRINT "
": FOR I = 1 TO 20: PRIN
T " " ": NEXT : NEXT
```

TOTAL: 3131

If you like to peek around in the Apple's memory, give ADDRESS.PEEKER, by Richard McMillan of Commerce, GA, a try. When this one-liner is run, you will be prompted for the beginning and ending memory locations that you would like displayed. Be sure to enter these locations in decimal format. After this information is entered, the decimal and hexadecimal value of the first memory location will be displayed on the screen. Each subsequent keypress will display the contents of another memory location. ADDRESS.PEEKER is ProDOS and DOS 3.3 compatible.

```
45 1 HOME : PRINT CHR$(21)::
H$ = "0123456789ABCDEF":
INPUT "START ADDRESS:":
S: INPUT "END ADDRESS:":
:E: FOR I = S TO E:L =
PEEK (I):L$ = STR$(L)
:B = INT (L / 16):B$ =
MID$(H$,B + 1,1):C$ =
MID$(H$, INT (L - 16 *
B + 1),1): PRINT I = "
TAB(12 - LEN (L$))L$ =
"$"B$C$: GET A$: NEXT
```

TOTAL: 0001

## Typing These Programs ★ ★ ★ ★ ★

Here are a few tips for typing in one-liners and two-liners. Be sure to omit spaces when typing in Applesoft programs, unless the spaces appear in strings between quotes, or in REM or DATA statements. You'll find it easier (and often essential) to substitute the question mark (?) for the PRINT statement. And when typing in machine language programs, it's safe to type in just the second digit of a hexadecimal pair if the first digit is a zero, e.g., the hex pair 03 can be typed in simply as 3. For more information on typing in programs, see the Typing Tips section.

## The Ground Rules ★ ★ ★ ★ ★

Your programs must be your own, original work and may be written in Applesoft or machine language. You must be able to enter your program directly from the keyboard, without using a programming aid or line editor. Programs must be submitted on disk, accompanied by an 8.5- x 11-inch sheet of paper with your name, address, Nibble disk choice, program instructions and the words "One-Liner Contest" or "Two-Liner Contest."

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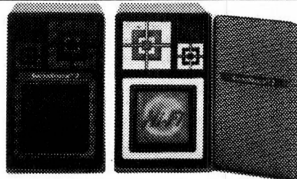
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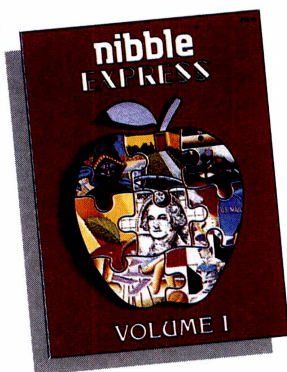
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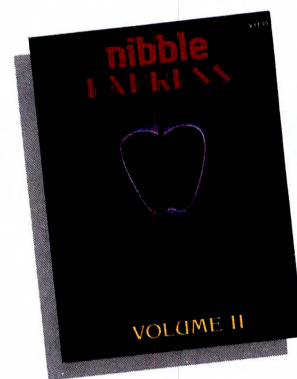
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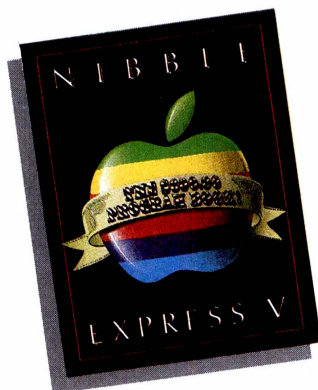
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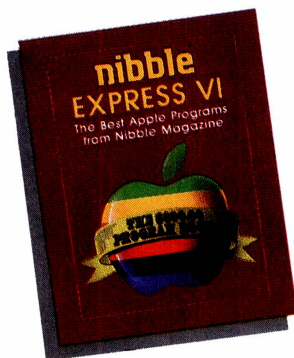
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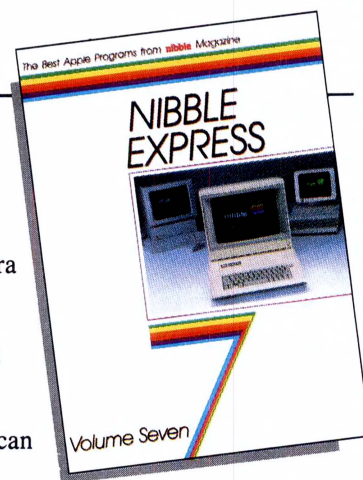
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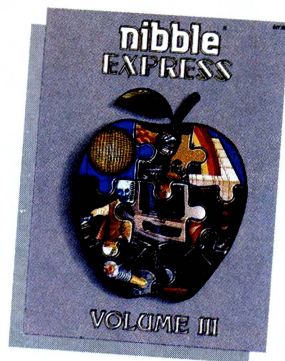
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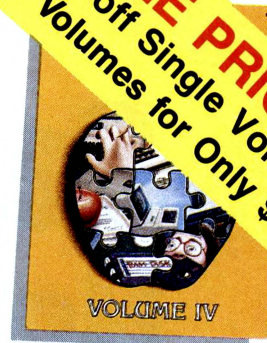
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It's one thing to design the landscape around your house with trees and fountains, but it's absolutely amazing to do it with **Design Your Own Home, Landscape!** It's thrilling to see what tree planting ideas will look like after 10 or 30 years of growth, an imaginative feature of the program from Abracadata.

Landscape for the IIGS, also available for the IIe and IIc, lets you draw a basic outline of your house, and then select plantings to put around it. Working in a top view of your house and land, you place the plantings you want from a selection of 28 trees and 17 shrubs. You can add objects to your house and yard, such as picture windows and a storage shed.

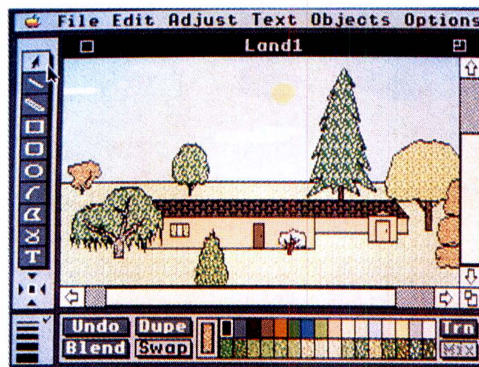
Once your basic trees, shrubs, and objects are placed using the mouse and standard cut, paste, and move procedures, you can view them from any of four sides. This gives you the perspective of approaching the house from any direction. In these views, and the top view, you can select any or all of the foliage and adjust their age using the mouse and a scroll bar. You may find that a tree is too overpowering for the view you want from the street, or that it would shade the house too much.

There are limitations to the detail you can attain with this portion of the the program. For instance, you can't draw a driveway or sidewalk in the top view, nor can you add ground covers or grasses. For adding these details, you need to use the Finishing Tools. You can add any type of object, and additional views are included for the sheds, fences, and windows. A color monitor makes this feature a lot of fun, as you have a lot of options for palettes and patterns. Text can

also be added with the finishing tools.

If you still want to jazz up your landscape plan more, a separate Paint Your Own Home program provides a fairly complete draw program, complete with a small clip art library of trees, sports, architectural shapes, and miscellaneous items. When you're finished, you can print your design on an ImageWriter or LaserWriter. And if you have the program add numbers to the trees and shrubs, you can have it print out a shopping list!

Additional clip art files of trees and shrubs are available for the South, East, Southwest, and Northwest regions of the U.S. These are paint-layer disks that are more realistic than the



object-layer plants.

If you need ideas for planning your landscape, 24 sample plans are included with the package, and you can order an additional disk of 48 drawings. These are all variations on the themes contemporary, traditional, colonial, Spanish, Victorian, and Saratoga.

Landscape is a fun program to use, and indispensable if you are toying with various designs for the greening of your yard. Its 80-page manual has an extensive table of contents that makes up, for the most part, for the lack of an index.

Landscape complements the two other Abracadata programs in the Design Your Own Home series: Architecture and Interiors. Landscape for the IIGS comes on two 3.5-inch disks and costs \$89.95. The IIe, IIc, and IIc Plus version comes on 5.25-inch disks and costs \$69.95. Supplemental disks cost \$29.95. Contact Abracadata at P.O. Box 2440, Eugene, OR 97402; (503) 342-3030.

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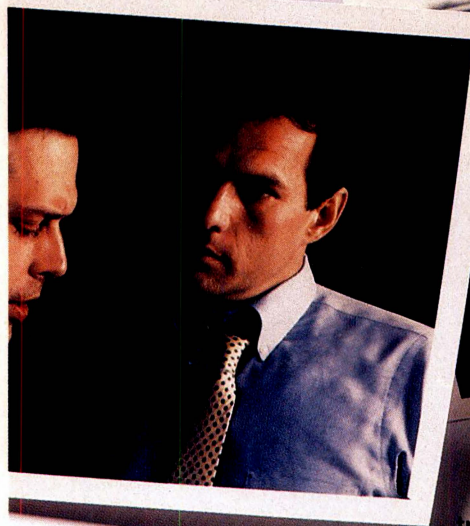
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